CHEMICAL INDUSTRIES

FORMERLY KNOWN AS "CHEMICAL MARKETS"

VOLUME XXXIII OCTOBER, 1933 NUMBER 4

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CHEMICAL INDUSTRIES is published monthly by Chemical Markets, Inc. WILLIAMS HAYNES, *President;* H. H. ADAMS, *Vice-President;* WILLIAM F. GEORGE, *Secretary-Treasurer.*

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CHEMICAL INDUSTRIES

VOLUME XXXIII NUMBER 4

Gold and Dollars

AS OF October first, the average of heavy chemical dollar prices had advanced since March a slight fraction less than five per cent. Computed on the gold basis they had actually declined 32 per cent. In cold figures this sets forth clearly the dead hand of uncertainty which has gripped all business. With the future of the dollar, in terms of gold, unknown, neither buyer nor seller is willing to contract for 1934 deliveries. At this season of the year particularly, this is a very serious drag upon recovery, and unless the President promptly commits himself to a monetary policy, business must devise some fair and adequate measure of adjusting values should currency continue to fluctuate.

In the chemical industries there is no unanimity of thought on this vital problem. A telegraphic canvas of twenty-five leading companies brought to light only confusion and uncertainty. Many are refusing to make commitments for further delivery. All recognize the seriousness of the situation. None has a definite plan or policy to suggest. Nevertheless, some standard of adjusting values must be promptly found. The old "gold clause" of sales contracts has been abrogated. An adjustment on the basis of 23.22 grains of gold in U. S. dollar would be effective only if the Government officially changes this standard. Adjustment on the basis of the price of coal or labor is difficult to determine, and only accounts for a portion of industrial costs. The Fischer index and the Department of Labor's cost of living index both include elements that have little bearing on industrial costs. The inability of buyer and seller to find a fair sliding yardstick is the most telling argument for the need of all business for sound money.

It is easy to understand the President's reluctance to announce a fixed monetary policy. At home and abroad his control over currency values is his most powerful weapon. But it is fast becoming a critical question whether the lack of confidence inspired by his silence does not so endanger the whole recovery program that he must declare himself.

Labor, Prices, and NRA Enforcement

It is not apparent that the NRA authorities have formulated their objectives very clearly. The blanket codes have helped unemployment, increased buying power, educated both employers and employees, and enlisted public support. In none of these have the net results been what was expected; and save in working knowledge of the NRA program, it is not likely that the permanent codes will markedly increase buying power or rouse more public enthusiasm.

On the other hand these codes raise three questions as yet unanswered. The present status of the labor union question is satisfactory to neither side, though the open, published price (as adopted in the Chemical Alliance Code) is apparently regarded with favor, nevertheless, the whole price-fixing question is sadly in need of clarification. The question of enforcement looms bigger as more permanent codes are approved, and as we pointed out three months ago, will prove the crucial test of NRA.

Labor unions were plainly favored in the very wording—collective bargaining—of the Recovery Act, and the administration has seemed biased against the company union and the open shop. Such favoritism will fan the old flames, and even if the union leaders are inept enough to fumble their advantage, a clean statement of official neutrality is needed.

Whether the Government dares sanction price-fixing in the face of the buyers' belief that price-cutting is to their advantage and contrary to twenty years precedent of law and sentiment, is much to be doubted. Accordingly, NRA leanings towards open prices and control of unfair practices probably indicate future policy. Enforcement is still put up to the industries and there is very evident reluctance to go to court to punish code ignorers or violators. Some day this issue must be faced, for the industries cannot patrol and punish their own members. As a matter of fact, if business either gets very much better or very much worse, it will be quite obviously to the general interest of the whole group to ignore certain code restrictions. Such a situation will make the labor and price problems appear to be childishly simple.

NRA has accomplished much that is definite and constructive. It suffers in reputation in not being the miracle worker the ballyhoo promised. It suffers in execution because it tackles an unprecedented task of titanic magnitude. To the industrialist it is by long odds the most vital factor in the present situation and it may have stupendous influence over future developments.

By Any Other Name

President Roosevelt has one definite, significant accomplishment greatly to his credit. He has shown us all that we stand at the threshold of a new economic epoch. Even the most conservative believer in *status quo ante* knows now that in the future business will be different. The old era of a price economy controlled by competition, working freely through supply and demand, is past. It has been passing for the last twenty years, and we shall make the difficult reconstruction period shorter and easier if we recognize and plan for the new phase in industrialism. In this new phase chemical processes are destined to play a bigger part, and the future of all the chemical industries is indeed brilliant.

At the moment we face a similar but more serious change than was wrought by the war, and it is the immediate task of this magazine to serve the new and greater needs of its readers. To this end, we have made certain changes in our services. To assist us we invite your suggestions and questions. Our surest guide is what our readers want. After the war when price changes dropped from over a thousand a month to twenty-five or thirty, we did not hesitate to change from a weekly price and news reporter to a monthly business magazine. The very tangible interest in new processes and new products shown by our readers prompts the expansion of these sections. The extension of the statistical services is obviously in line with the necessity for a new and better control of chemical activity. We aim more completely and even more concisely than in the past to keep you promptly and accurately in touch with the commercial aspects of making and using chemicals.

This has always been our editorial aim—for sixteen years—this has been the business magazine of chemical process industries. Our interest in the dollars and cents side of chemistry is no panic-born switch of policy, and the substantial growth of subscribers during the past two years would seem to confirm the value of our experience and growing importance of economic problems.

Quotation Marks

The first code was brought down from Mount Sinai by the Hebrew law giver. Had its terse provisions concerning gods of silver and gold, covetousness, stealing and lying been followed, other codes would not be necessary now, 3,500 years later. The Roosevelt codes merely reaffirm the code of Moses.

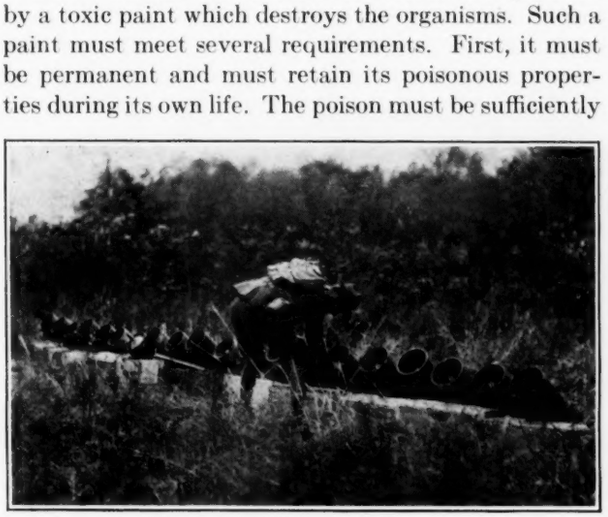
Peacetime Activities of the Chemical Warfare Service

By Capt. Robert E. Sadtler, U. S. A.

CHIEF duty of the U. S. Chemical Warfare Service is purely military: first, the development of smoke apparatus, projectiles, and toxic materials and second, the organization, equipment, and training of chemical troops. In addition to these two missions, however, this service has proved itself valuable to peacetime America by important contributions to chemical science and industry.

Need for poisonous paint for the exterior of ocean going vessels is caused by the accumulation of marine organisms on the hulls, which cuts down speed, increases fuel consumption, and reduces the ship's working time by the amount spent in drydock to clean the bottom. Barnacles are the principal marine organism attaching themselves to the ship's bottom. They may accumulate to such an extent that they project several inches from the ship's hull although the volume of growth depends mainly on the latitude and season. As these growths live only in salt water, it is possible to kill them by docking the vessel in fresh water, but the shells still adhere, thus furnishing resting places for new growths.

The Chemical Warfare Service solved this problem by a toxic paint which destroys the organisms. Such a paint must meet several requirements. First, it must be permanent and must retain its poisonous properties during its own life. The poison must be sufficiently



Battery of projectors in position.

Cylinders emitting gas.

powerful to kill or prevent the attachment of the marine organisms, although the poison need act only during the period of attachment as the organisms begin life as free swimmers, then attach themselves and obtain food from the surrounding water. Another paint was developed to be used under the anti-fouling paint to protect the steel plating of the ship from the corrosive action of the sea water and to prevent damage from the toxic paint. Moreover it was desirable that these paints consist of domestic materials to keep the cost of manufacture and application as low as possible.

Two different toxic paints were developed—a varnish type applied cold and drying by evaporation, and a hot-plastic paint which is applied in a melted condition and solidifies on cooling.

The hot-plastic paints are more expensive to apply as they form a heavier coat. They are much more durable, however, and are advised for use on long cruises. This type of paint was tested on the bottoms of several destroyers and gave excellent protection on exposure to marine growths.

The varnish type consists of a vehicle, such as gum or resin, pigment giving body and color to the paint, a volatile solvent which acts as a thinner, and the poison. Many materials were tested experimentally in the effort to find the proper relation between the poison and the vehicle. If the paint film is too impervious to water the poison cannot act while, on the other hand, if it holds the poison too loosely, the poison will dissolve, leaving the paint unprotected.

The oxides of copper and mercury are the most effective poisons, and the most promising vehicle, resin, modified by coal-tar.

This anti-fouling paint, according to competent authorities, will save the shipping industry from

$125,000,000 to $150,000,000 annually in reduced fuel and maintenance costs.

At the request of the National Research Council, in 1923, the Chemical Warfare Service sought a poison for marine borers that destroy docks and other water-front structures. The annual loss due to these borers is estimated at over one million dollars.

The studies were conducted at Beaufort, N. C., where could be found all the principal types of marine borers. The Service was greatly aided in the research by the Quartermaster Corps, U. S. Army, the Navy Department, and the Department of Commerce, which supplied funds and laboratory facilities.

The poisonous compounds were made and investigated at Edgewood Arsenal, Md. More than one hundred compounds in all were studied. It was found that the organic compounds of mercury, arsenic, and copper were the most efficient. Most effective of all were the arsenical compounds used in chemical warfare, or derivatives of those compounds. Lewisite, the most poisonous of the war gases (made by passing acetylene through arsenic trichloride in the presence of aluminum trichloride as catalyst) gave a derivative which proved to have the highest specific toxicity against marine borers.

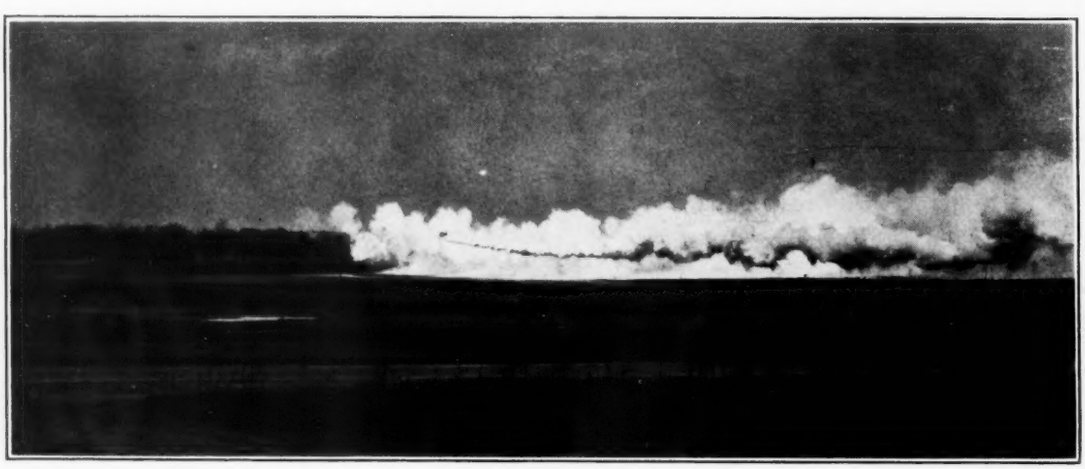
The poisonous compounds were mixed with either fuel oil or creosote and in this mixture were saturated test pieces of pine and oak, one foot long and three inches square. Each compound was soaked into three test pieces and they were installed in sets of three. Each test piece was sheathed on two sides by untreated half-inch pine boards. The embryo marine borer was thus enabled to gain entrance in the untreated wood and by the time the chemically treated portion was reached, the shipworm was fully grown and less susceptible to the action of the poison. In three months the untreated pieces were completely riddled. The test pieces which stopped the borer, however, were the ones soaked in the solutions in creosote of five compounds: mercury benzoate, copper ortho-nitrobenzoate, mercury resinate, mercury stearate and diphenylaminechlorarsine (a poison smoke material).

The most effective of the above mixtures having been determined, they were used to treat pine fence posts, about eight feet long and six inches in diameter. Thirteen sets of ten posts each were installed in the Beaufort Harbor, in 1924. One post of each set will be removed each year for inspection and by removal in this manner the test will cover a ten year period.

Straight creosote, usually used on water-front structures, will not stop the borers and 15 chemical compounds are known at present which furnish from 25 to 50 times greater protection than creosote. The protection offered by creosote alone may be increased very materially, at slight cost, by the addition of some one of the poisonous compounds mentioned above. Fuel oil plus a specific poison will give better protection than creosote at a lower initial cost. The use of these poisons will not involve any change in the present commercial methods of treating piling, and there is little or no increased hazard in the installation of this piling.

Every ship entering a U. S. harbor from a foreign port must be fumigated, if not by its own officers, by the officials of the Public Health Service. This is chiefly to prevent the introduction of bubonic plague and typhus fever. Bubonic plague is transmitted by rats which carry fleas infected by the bacillus. Both the rats and their parasitic fleas are killed by fumigation. Typhus fever, an acute infectious disease is transmitted from an infected person by the bite of the body louse. Lousy persons arriving at U. S. Quarantine are detained until de-loused and their baggage is fumigated.

An extremely penetrating and very poisonous gas, hydrocyanic acid, was universally used for this fumigation. Due to its lack of suitable warning properties and its extremely poisonous character, many persons have lost their lives by coming into contact with this gas either during the process of fumigation or immediately thereafter, before the gas has dissipated itself. Refrigerated chambers may cause a condensation and absorption of hydrocyanic acid gas which will not be entirely removed by ventilation. When the temperature rises in these chambers, sufficient hydrocyanic acid will be vola-



Airplane laying smoke curtain of titanium tetrachloride. These curtains are used either to blind the enemy or screen the advance of friendly troops. A column of troops one mile long can be sprayed in twenty seconds with this apparatus.

Army tank producing a smoke screen as it travels. The titanium tetrachloride is discharged by means of carbon dioxide under pressure.

tilized to prove fatal. Deaths have also occurred by leakage of the gas through cracks into adjoining rooms and to the exterior. Due to the weak odor of the hydrocyanic acid gas the average person is not warned before he is overcome.

The Chemical Warfare Service, with the Public Health Service, has developed a correct, scientific method of fumigation whereby adequate warning is given of the presence of hydrocyanic acid before it has reached dangerous concentration. An intense tear-gas (cyanogen chloride) is generated along with the hydrocyanic acid gas at the time of fumigation. This tear gas stimulates the tear gland of the eye, thus giving evidence of its presence and also warning of the presence of the deadlier but more insidious gas.

This method has also been utilized in the illuminating gas industry to furnish warning of the presence of gas leaks before the concentration of carbon monoxide becomes high enough to kill.

The fumigating mixture mentioned above is generated by adding a mixture of sodium cyanide and sodium chlorate to dilute hydrocyanic acid. This new, safer method has been adopted by the Public Health Service and is now in general use.

Agriculture also has profited by C. W. S. research. Ravages of the boll weevil is a serious economic problem of cotton growers. Millions of dollars worth of grown cotton has been destroyed by this insect, and many millions more spent by the Federal Government and the southern states in the effort to control it.

The Chemical Warfare Service was authorized by Congress in 1924 to investigate control of the boll weevil. Much preliminary work was necessary to determine the relative toxicity of a large number of compounds, using as a standard of comparison, commercial calcium arsenate, then considered the most effective chemical against the insect. Some idea of the scope of these preliminary tests may be shown by the fact that more than a quarter of a million boll weevils, 1,000 possible poisons and poisonous mixtures, and 2,500 combinations thereof were utilized in these experiments.

The poisons, in the form of dusts, dissolved in some suitable substance, or mixed with molasses, were placed in ordinary glass tumblers with the boll weevil. The promising poisons were given additional tumbler tests and were also tested by experiments in greenhouse and field to determine if they would damage the cotton plant itself. Compounds which successfully passed these preliminary checks were set aside for test on a large scale in the field. These field tests were conducted at Tifton, Ga., Gainesville, Fla., and Summerville, S. C., in 1927. They were made directly by the personnel of the Chemical Warfare Service in cooperation with the state experiment stations at these places.

The requirements to be met by a weevil poison were many: It must—

(a) Adhere to the cotton plant.
(b) Quickly kill the boll weevil.
(c) Not damage the cotton plant.
(d) Be available in large quantities and be capable of being prepared cheaply and easily.

Three poisons seemed to meet the four above requirements: (1) a special sodium fluosilicate obtained as a by-product in the manufacture of acid phosphate, (2) a special barium fluosilicate, and (3) a special calcium arsenate with 20 per cent. arsenic as arsenic pentoxide as compared with the 40 per cent. arsenic of the commercial calcium arsenate.

Of these three poisons, the two selected by the C. W. S. workers as most effective are the special calcium arsenate and sodium fluosilicate. Both are cheaper and more effective than standard calcium arsenate. As the cost of arsenates is proportional to their arsenic content obviously an arsenate of lower arsenic content, if effective, would result in considerable saving. This special calcium arsenate is cheaply and easily prepared by heating together calcium carbonate (precipitated chalk) and white arsenic with an excess of air at a temperature of

650° C. Neither of these poisons damage the cotton plant. Both possess high weevil toxicity. The raw materials needed in the manufacture of both are sufficiently common and plenteous to supply any possible demand. Both are comparable in cost with calcium arsenate on a pound-per-pound basis. These poisons have been taken from the laboratory stage by the Chemical Warfare Service and developed to real economic importance in the field.

Sodium fluosilicate does not stick to the cotton plant as well as calcium arsenate, but it is a quicker weevil-killing agent. Moreover, by a special process, it may be made equal to the calcium arsenate in adhering qualities without thereby impairing its effectiveness as an insecticide. The C. W. S. has also demonstrated that calcium arsenate can contain as low as 20 per cent. arsenic and still be as effective as the present product containing 40 per cent. arsenic. An effective new method for the manufacture of this special calcium arsenate has been developed by the Chemical Warfare Service and it can be utilized commercially.

Use of Tear Gas in Controlling Mobs

Another interesting discovery of the Chemical Warfare Service is the use of tear-gas in controlling unruly crowds and individuals. The humanity and effectiveness of this method, in comparison with subduing a mob by bullets has been frequently demonstrated. A simple tear-gas (chloracetophenone) in harmless, non-explosive grenades may be used as effectually without permanently injuring anyone who may encounter it. This tear-gas is a non-poison in the open air, no matter what the concentration and yet is effective even with one part of tear-gas to three million of air. Its only reaction is the stimulation of the lachrymal gland, in the corner of the eye, causing a copious flow of tears. It has no injurious action on lung or blood. The effect is completely dissipated at the end of ten or fifteen minutes if the affected person quickly removes himself to a pure atmosphere and faces the wind.

Tear-gas, as advocated by the C. W. S. has been used by state and city police on many occasions against ungovernable mobs. In every case the effect was instantaneous and the mob stampeded, most of them before actually feeling the effects of the tear-gas. Contrasted with fire-arms there are three great advantages for the use of tear-gas:

(1) The psychological effect is even greater than bullets.

(2) The humanitarian aspect—no one can possibly be injured permanently by the tear-gas.

(3) Its fool-proof qualities—tear-gas can be used by persons of average intelligence with less training than is necessary to use fire-arms properly, and its misuse cannot have the same disastrous effects. It is easier for a mob to maintain its morale in the face of bullets than in the presence of invisible gas. The mob has a certain uncertainty of mind as to the probable effects of the gas. The psychological effect is greatly enhanced at night. The only source of injury from using tear-gas is the possibility that members of the mob may be trampled upon in efforts to escape. By using tear-gas in moderation and leaving adequate avenues of escape free, this danger may be completely eliminated.

Protection Against Industrial Poisoning

Still another peace-time service of the C. W. S. is the development of various masks as protection against the deadly gases employed in many industries and the detailed study of methods to prevent fatalities from other forms of poison. Since all of these poisons have at one time or another been brought to attention as possible chemical warfare agents, the Service has necessarily made close study of them and methods of protecting against them. And it has been able to offer freely the knowledge thus gained to industry.

Due to its prevalence, insidious properties, and the difficulty of protection against it, carbon monoxide is one of the most dangerous industrial poisons. It cannot be used in warfare directly as a gas due to its physical properties, but it enters into the manufacture of some gases like phosgene ($CO\ Cl_2$) and it was often encountered in the World War wherever explosives were detonated in enclosed spaces. Carbon monoxide is a product of the incomplete combustion of all fuels and is a constituent of illuminating gas as well as of the exhaust gases of gasoline engines. Its character and effect is equally deadly both in war and peace. It combines avidly with the hemoglobin of the blood and prevents its oxygenation in the lungs.

A few years ago the Navy Department requested the Chemical Warfare Service to develop a mask with a self-contained canister (a canister is the can attached to the face-piece of a gas mask containing the chemicals which remove the poisons from the air as it is drawn into the mask) for protection against carbon monoxide in submarines. At that time the only practical device was the oxygen helmet and hose mask whose bulk handicapped the wearer.

Carbon monoxide is difficult to remove from the air. Due to its high volatility it is difficult to absorb. It is chemically inert—does not readily react with other chemicals, and has a very low solubility in solvents—two factors which increase the difficulty of protection. As the inhaled air in a mask is only in contact with the absorbent for about one-tenth second, the absorbent must be very quick to react with the carbon monoxide under all possible conditions of temperature and pressure. In addition, the carbon monoxide absorbent must be reasonably hard, offer moderate breathing resistance (this is the resistance encountered as the incoming air is drawn by the lungs through the chemicals in the canister) and be capable of quantity production.

The Chemical Warfare Service not only devised a mask which offers complete protection against carbon monoxide, but also brought forth two valuable by-products. First, a better and cheaper method of making iodine pentoxide: and second, a simple detector for carbon monoxide which causes a color change from the original white of the detecting material to bluish-green, then violet-brown, and finally black, depending upon the concentration of carbon monoxide. This indicator will quickly and accurately show whether or not a dangerous concentration of carbon monoxide is present.

The results of this C. W. S. research have been adopted by the Navy for submarine crews and by a wide range of industrial firms. The carbon monoxide detector has proven its value in mine rescue work and recovery operations after fires and explosions. It may also be used for testing the air around gas producers and blast furnaces and wherever carbon monoxide is a hazard.

The Chemical Warfare Service is now working on the problem of the elimination of carbon dioxide from places where adequate ventilation is impossible.

The Ammonia Mask

Ammonia fumes are encountered most frequently in ice plants and in handling cylinders, but also in fire fighting and in miscellaneous chemical plant work. Inasmuch as the war gas mask canister did not afford satisfactory protection against ammonia, it was necessary to develop a special canister to meet this requirement and the C. W. S. set out to do so. The former unsatisfactory canister contained either pumice or some inert granular substance saturated with sulfuric acid. This canister had three great disadvantages connected with its operation:

(1) Extremely high breathing resistance.

(2) Fumes given off by the pumice-sulfuric acid mixture which made the inhaled air very warm and irritating.

(3) Corrosion of the metal parts of the canister by the sulfuric acid.

A new absorbent for ammonia was found which completely eliminates these disadvantages and has twice as great absorptive capacity for ammonia as the old absorbent.

The ammonia canister is very similar to the war canister in appearance. It affords complete protection against low concentrations of ammonia for a considerable period. An unbearable skin irritation will give ample warning of the presence of a high concentration of ammonia and the canister will protect the wearer for a longer time than the skin irritation can be tolerated. When a small amount of ammonia can be smelled it is warning that the canister is nearly exhausted. The amount which penetrates is usually small for some time so that the wearer of the mask is not in any immediate danger and he need not move out of the locality for some time. This ammonia canister affords the usual advantages. It is easily replaced by a new one when exhausted, and it may be attached to any type of army gas mask face-piece. The canister may be carried in the side carrier under the left arm, or on the back, or on the breast, as desired.

Special Public Health Service Mask

A third type of gas mask developed by the C. W. S. has been of use to still another field of peacetime activity—the Public Health Service. It is employed in the work of fumigation.

A poisonous gas (hydrocyanic acid gas) and a tear-gas (cyanogen chloride) were the two gases in which the mask was to be used. It must therefore have a high capacity for absorbing them, and as a result of thorough study of absorbents for these two gases, two chemical compounds were found particularly effective. The absorbents are placed in a modified war canister. By an ingenious arrangement, when the canister is exhausted, tear-gas rather than poisonous gas penetrates and gives warning to the wearer of the mask. This is due to the proportions of the mixture in the canister. The tear-gas which penetrates after exhaustion of the canister is immediately detected by its action upon the eyes and by its odor. The amount of tear-gas which will penetrate is extremely small for some time so that the workman may finish his work in an emergency without danger from the hydrocyanic acid gas present. After exhaustion of the canister it may easily be replaced by a new one.

The canister offers two great advantages — it has only a moderate breathing resistance and it affords complete protection for several hours against any normal concentration of hydrocyanic acid gas (a poison) and cyanogen chloride (a tear-gas). The special Public Health Service canister may be attached to any type of war mask and it may be carried in the regulation army gas mask carrier.

The Chemical Warfare Service has special talent and equipment for investigations in the field of poisonous materials and protection therefrom. As soon as a problem is solved and a new device is produced, Service does not attempt quantity production or to supply commercial needs. It manufactures the quantity immediately needed by the Government, and publishes its findings so that commercial firms may engage in the manufacture.

The appropriation for the support of the Chemical Warfare Service averages less than one-half of one per cent. of the total appropriation for the Army, and of this meager amount one-third is devoted to research and development. The contributions of the Chemical Warfare Service to industry alone have richly repaid the sums devoted to research, also having made possible the splendid protection of our Army and Nation against any possible enemy chemical warfare activities.

New Uses for Coal-tar

By R. C. Bickmore, F. C. S.

EFFORTS to improve the market for tar in England are taking the form of encouraging the further use of tar for road purposes, producing motor spirit by hydrogenation—cracking, and the manufacture of Diesel oil for motor transport.

When there is a shortage of toluol this hydrocarbon can be formed from the tar acids or from the cresol fraction of the tar acids. The reaction takes place at atmospheric pressure by passing cresol vapor over a molybdenum catalyst supported on active carbon, and the yield is 82% by weight. The time of contact is 0.5 seconds. For this purpose, then, a small plant only would be required. High temperature tars, giving tar acids containing about 25% of cresols, could be profitably and conveniently utilized in this way.

Careful control of pressure-hydrogenation of tar acids, using a molybdenum catalyst, has yielded, so far, a distillate equal in volume to the raw material and containing 20% of toluol only. Research is improving these yields.

Professor Morgan, at the Chemical Research Laboratory (see J.S.C.I. 1932, 51, 67t) has found further outlets for tars, (chiefly low-temperature tars). These uses are:

1. Synthetic resins from tar phenols.
2. Wetting-out agents from phenols.
3. "Resinoids" as a suitable base for paints, stains or lacquers.
4. Possibly, for cheapness, resins can be produced from the tar fractions to compete with the resins from pure phenol.
5. Wetting-out agents from phenols, (certain tar acid fractions from vertical and low temperature retort tars in the mercerization of cotton).
6. "Resinoids" as suitable bases for paints, etc. Lacquer from low-temperature resinoids (amounting to 7% of the tar). In high temperature tar they are at present in less amount (3%) but may be equally suitable.

An attempt to utilize coal-tar creosote instead of petroleum gas oil for water gas carburetting has given unfavorable results (see Proc. Inst. Gas Eng., 1931, 20th Rep. Research Committee), on account of low thermol yield of gas, deposition of naphthalene and formation of tar. Vertical retort creosote gave somewhat better results, but the use of higher cracking temperatures, and steam, effected no improvement. In the "Chemiker-Zeitung" (April 19, 1933, p. 304) Dr. H. Broche deals with the conversion of heavy tar oils into motor fuel via carboxylic acid (by partial combustion) and subsequent decarboxylation, the plant necessary being simple and cheap, and the process requiring no external heat.

Sixty-one kg. benzol can be obtained from 100 kg. naphthalene via phthalic acid (by oxidation). The vapor of the crude tar fraction, mixed with air, is passed at 400-450° C. over vanadium pentoxide or other suitable catalysts deposited on pumice stone.

Two hundred and four kg. naphthalene yields 100 kg. benzol (i.e. 49% yield). The market price of benzol being almost three times as high as that of naphthalene, it is important that this process has been applied to the tar oils boiling above 200° C.

Another source of utilization is the conversion of high-boiling tar fractions into viscous lubricating oils, by catalytic hydrogenation at 200° C. and 100 atmospheres initial hydrogen pressure, giving a maximum yield of 53% of good-quality oil.

By heating in atmospheric oxygen (air-blowing) a very high asphalt yield is obtained, but the asphalt-forming substances are not separable from the oils thereby produced. This polymerization of tar oils results in raising the yield of pitch from 60% to 90%. This is important, as pitch is scarce in Germany, and, moreover, the product is quite suitable for use as a briquetting agent.

The reduction in ignition point of the tar oil, to render it suitable for use for Diesel engines, competing with petroleum or lignite oils, was achieved by treatment with oxidation catalysts (e.g. vanadium pentoxide) deposited on Silica gel.

A simple method of reducing the ignition point of tar oils involves the introduction of an ignition contact constructed of corrosion-proof steel into the pre-combustion chamber of the Diesel engine.

German Tests of Power Alcohol

By Dr. Fritzweiler (Privy Councillor) and Dr. K. R. Dietrich

COAL and mineral oil as sources of energy seem to be irreplaceable, and the world economist regards with apprehension the consumption of these sources of energy, which, according to human measurements, must one day come to an end. Today this apprehension is diminishing, since we have learned how to release new sources of energy which will not fail so long as the sun continues to pour down its energy, radiating light and heat so lavishly.

Alcohol must be numbered among the sources of energy which can never run out; these sources are renewed from year to year by the sun.

For its manufacture it is well known that all materials can be used which contain either fermentable sugars already formed or substances containing, for example, starch flour, which can be converted by chemical treatment into fermentable sugars. Such raw materials are sugar, molasses, beets, fruits rich in sugar, plant juices, berries. Among the starchy materials which can be worked up into alcohol can be mentioned many cereals, potatoes and starch-containing roots (e.g., Manioc). Further, cellulosic materials, also fruit residues, and wine and beer yeasts can be used as raw materials and there is also the manufacture of alcohol by purely chemical processes. One need only remember the carbide process, the conversion of ethylene from bituminous coal-gas and many known syntheses. Not all known processes, however, are being worked industrially today.

The raw materials which come into question for the manufacture of alcohol in Germany are principally potatoes, followed by cereals, molasses, sulfite pulp liquors and, newest of all, wood. The manufacture of alcohol from calcium carbide has been carried out spasmodically. Potato-spirit distillers have special significance for East Germany, where there is a light soil. In this case the mash is the principal article of manufacture, while the alcohol is a valuable by-product. The advantages of the use of alcohol for heating and lighting purposes have been sufficiently well known for a long time.

Although in the past, alcohol has always been taken into consideration as a potential fuel because of its calorific value, now the importance of a home-produced supply of power fuel makes the question of power alcohol of cogent significance for the future. In this connection difficulties were to be expected, since the chemical and physical properties of the alcohols are very different, generally speaking, from those of petrols and benzols. If one compares the rate of evaporation, the vapor pressure, the heat capacity of the liquid, the latent heat of vaporization, the calorific value and the explosive limits of petrol and benzol with the values for alcohol (see Tables I-III), it is clear that alcohol cannot exhibit the same characteristics in an engine as do the two common fuels.

Table I

Liquid	*Vapor Pressure at 20° C.*	*Latent Heat of Vaporization at 20°C*	*Heat Capacity*	*Toluene No.*
Alcohol	44.1	231.6	11.84	130
Benzene	74.3	109.95	7.77	67
Toluene	21.9	97.16	7.88	100
Hexane	120.0	87.23	10.32	8
Heptane	35.5	87.33	9.88	37

Table II

Calorific Value

Alcohol	6,480	Cals./kg.	5,140	Cals./litre.
Petrol	10,500	"	7,700	"
Benzol	9,550	"	8,400	"

Table III

Explosive Limits

Alcohol	3.95–13.65
Petrol	2.4 – 4.9
Benzol	2.65– 6.5

Taking one point alone, the time of vaporization for alcohol is about eight times as large as that for hexane. Apart from the fact that a larger quantity of heat is necessary for vaporizing alcohol in a carburettor compared with that necessary for benzol and petrol, the behavior of alcohol is disadvantageous, in so far as its calorific value expressed per unit weight or per unit volume is far less than that of the other two fuels. However, in contradistinction to these disadvantages, alcohol has the advantage of permitting a higher compression ratio to be used, whereby the efficiency and the output of the engine can be substantially increased. An alcohol-air mixture can be subjected to a much higher compression ratio than can a petrol-air mixture up to the point of auto-ignition which must be avoided at all costs in a carburettor-fed engine.

In order to understand this point, the toluene numbers for individual fuels have been included in Table I. These numbers, according to the researches of Ricardo, have a certain relationship with the permissible compression ratio of a fuel. The higher the toluene number, the higher the compression ratio the fuel will stand.

If alcohol was used by itself as the power medium in the present design of internal-combustion engines, the results, due principally to its physical properties, would show the following disadvantages.

Through insufficient preheating of the alcohol, the fuel would be delivered into the cylinder in the liquid state and would pass through the combustion space partly unburned. Thereby the fuel consumption would be high and running on alcohol uneconomic. Also, a diminution in power output would be noticed, if the ignition were not sufficiently advanced and the size of the jet not increased. A larger volume of fuel per horse-power-hour must be fed to the engine, corresponding to the lower heat value of the alcohol. Finally, the motor would run unevenly due to bad mixing if the float of an ordinary carburettor intended for petrol work were not changed for one of a slightly heavier pattern; the carburettor float rises higher in the alcohol, because the specific gravity of the alcohol is higher than that of petrol, thereby closing the valve from the petrol pipe at a lower level than is desired.

Early Stages of Problem

Even if the foregoing alterations in the use of alcohol alone be considered as surmountable, still alcohol could not be compared with petrol as a fuel, since a considerable increase in fuel consumption must follow as a result of the lower calorific value. This could only be counteracted by raising the compression to at least 8:1, because by this means the thermal efficiency of the engine could be improved and the power output could be considerably raised without an increased fuel consumption.

Alcohol, accordingly, is in an unique position as a fuel for carburettor-fed combustion engines. An economic arrangement would only be possible in a specially designed engine which would be completely unsuited to petrol use. This inherent deficiency of alcohol was realized by engine designers almost from the beginning.

The Technische Hochschüle in Berlin and the Institut fur Garungsgewerbe, Berlin, as early as the years from 1896 to 1906 were testing the possibility of the use of alcohol in the place of petrol or petroleum, came to the unanimous opinion that engines, the compression ratio of which had been raised to 10:1, could be successfully and economically run on alcohol, in spite of its low calorific value compared with petrol.

On the other hand, running on alcohol would be uneconomic and uncertain in engines with a normal compression ratio.

This finding is now supported in the generally well-known fact that the efficiency of a fuel can only be estimated on the heat content which can be converted into useful energy in the engine. It is understandable that on these grounds alcohol, at that time, could not be generally brought in as an engine fuel, as the motor-car industry denied it support by not building high-compression engines.

The problem of the use of alcohol as a fuel was followed up. The question arose whether it would be possible, instead of using alcohol alone as a fuel, to use it mixed with other fuels without appreciable alterations to the existing engines being necessary. Attention was directed to narrowing down to a minimum the effect of the following properties of the common fuels without, however, affecting their advantageous properties. The possibility here was of mixing it with other fuels, especially petrols, whereby its inferiority as a fuel (higher latent heat of vaporization, lower vapor tension, lower rate of vaporization, higher latent heat of the liquid, lower calorific value) could be averaged out, and the disadvantageous property of petrol (low resistance to compression) could be compensated by the valuable properties of the alcohol. All kinds of mixtures were made up and their adaptability for engines tested out on the bench. Difficulties were encountered in the preparation of homogeneous mixtures with petrol, as the alcohol contained five per cent. of water. First of all, recourse was had to "binders," such as ether, benzol, etc., and by this means a sufficient homogeneity of the mixtures at lower temperatures was attained. The results of the bench tests very early showed the usefulness and superiority of a mixture of petrol containing 20-30 per cent. by weight of alcohol and a definite addition of ether. The mixtures were adequately resistant to compression, and comparable in actual use with petrol as regards the power output. The engines could be run unhesitatingly and without any alteration on the mixture; the flexibility and non-deposition of carbon were brought out very distinctly. As the alcohol content was raised, so the undesirable physical properties of alcohol as a fuel made themselves more apparent.

Absolute Alcohol

The more the bench tests discovered the good points of the new fuel, the less recognition could it find in practice as a fuel of equal value in every respect to petrol or benzol. The water content of the mixture caused separation on addition of petrol or benzol, which led to difficulties and queried the general usefulness of the mixture. The Government Administration of Alcohol Monopoly decided therefore to release absolute alcohol for mixing purposes, and had the same mixtures, without the addition of binders, tested on the bench. The results showed that mixtures of 20-30 per cent. by weight of absolute alcohol with 80-70 per cent. by weight of petrol are at least as practicable as petrol in the ordinary internal-combustion engine. The advantageous engine properties of the petrol were retained in the mixtures of these proportions and its proclivity to knocking was reduced by the addition of alcohol, while the disadvantageous engine properties of the

alcohol itself could no longer be discerned. If there is a somewhat increased fuel consumption in engines of normal compression ratio, this increase can only be very small.

Petrol mixtures containing more than 30 per cent. alcohol exhibited another characteristic. The special physical properties became more pronounced with increasing alcohol content, to the extent that in ordinary petrol engines satisfactory running could not be obtained. This would only be possible if the stipulations mentioned at the beginning are taken into account in a ratio corresponding to the increasing alcohol content. However, the performance in engines of ordinary compression remains inefficient, because at the same output the fuel consumption of the mixture rich in alcohol is appreciably greater than that of the mixture poor in alcohol.

Approximately the same results would be obtained if, intead of petrol, benzol is mixed with alcohol. When petrol and benzol are both added to alcohol, a particularly advantageous mixture results, if the following mixing proportions are adopted:—

20 per cent. by weight absolute alcohol
30 per cent. by weight benzol
50 per cent. by weight petrol

or

10 per cent. by weight absolute alcohol
40 per cent. by weight benzol
50 per cent. by weight petrol

The use of practically water-free alcohol as a fuel could only be realized if economic dehydration processes were available which would not appreciably raise the price of the spirit. The following processes have been evolved up to date:—

1. Petrol-Benzole Process of Usines de Melle, France, by Guinot.

2. Benzole Pressure Process, E. Merck and Company, Darmstadt, by Dr. von Keussler.

3. Drawinol Process by Government Administration of Alcohol Monopoly, Berlin, by Dr. R. Fritzweiler and Dr. K. R. Dietrich.

4. Salt Process of the Hiag Holzverkohlungsindustrie G.m.b.H., Frankfurt-am-Main, by Dr. Gorrhan.

5. Lime-Pressure Process, E. Merck and Company, Darmstadt, by Dr. von Keussler and Dr. Peters.

The first three named processes work on the basis of azeotropic distillation, while in the Hiag process the alcohol is dehydrated through the agency of a mixture of potassium and sodium acetates. The Usines de Melle process is fundamentally characterized by the use of a petrol-benzol mixture as dehydrating agent, and the process worked at atmospheric pressure. In contrast to this, in the Merck process dehydration takes place at 10 atmospheres pressure. In this case also, a petrol-benzol mixture is used as the dehydrating agent. The use of pressure enables a step-by-step utilization of the steam. The process brought out by the German Government Administration of Alcohol Monopoly employs a specially stabilized trichlorethylene as dehydrating agent. Its special properties permit the use of a much simpler plant, and its low heat of vaporization offers special economic advantages.

When it had been discovered that alcohol when it was mixed with about 80 per cent. of hydrocarbons, in spite of its special engine properties, could also be used advantageously in ordinary carburettor-fed engines, the Governments of France, Sweden, Italy, Spain, Hungary, Panama, etc., and also Germany, legislated so as to develop the production of power alcohol. By the decree of the German Government, dated July 4, 1930, relating to the use of alcohol for power purposes, any person importing a fuel from abroad or manufacturing it in the country, is bound to take from the Government Administration of Alcohol Monopoly an amount of alcohol representing a certain percentage of the weight of the imported or home-manufactured fuel. In order to bring in the decree gradually and to avoid unnecessary and costly severities, the prescribed percentage to be added to the fuel was slowly raised. From August 1, 1930, to March 31, 1931, it was 2½ per cent., and from then until September 30, 1931, it was 3½ per cent. A further rise to 6 per cent. was fixed for the period October 1, 1931, to September 30, 1932. When it was seen that the power alcohol could be marketed without difficulty and further, that the consumer had forgotten his prejudice against it, the prescribed addition was increased to 10 per cent. from October 1, 1932. This increase did not necessitate, however, that all petrol or benzol had to be mixed with 10 per cent. power alcohol. A part of the petrol and benzol is still brought on to the market in Germany without addition to it of power alcohol, while to another part is added more than 10 per cent. of the power alcohol as the following details show.

Supplies of Power Alcohol

The acknowledgment that power alcohol can be mixed advantageously with petrol to the extent of at least 10 per cent. (the Decree in Germany moreover covers a 20-30 per cent. by weight power alcohol addition) could be taken at the given time as evidence for raising the prescribed alcohol addition or to enforce a general addition of 20 per cent. by weight of power alcohol. Such a scheme could only be put into practice following a fall in price of the power alcohol itself, which at the present moment in Germany costs R.M. 50 per hectolitre. This possibility may be realized by power alcohol from wood, which on the one hand would increase the supplies to the Administration and on the other hand would lower the price. If alcohol can be successfully and cheaply made in Germany from wood, then the problem of power alcohol will also be for the most part solved economically. The alliance of the agricultural and forestry interests produced thereby could only be to the general good.

Chemical Uses of Petroleum

By F. B. Thole and S. F. Birch
Anglo-Persian Oil Company

At the present, production of chemical intermediates cannot be said to figure largely in the uses of petroleum and its products, but they are of considerable importance and are progressively increasing. Even so, from the standpoint of their magnitude and economic soundness, the great volume of petroleum annually produced is more than sufficient to produce all common chemicals and solvents now known which could conceivably be made from petroleum without interfering with the adequate supply of refinery products. It is hardly conceivable that the manufacture of chemicals and solvents could possibly affect the petroleum price structure. The upper limits of the value of petroleum will eventually be met by the price of coal.

At the present time the value of the chief raw material for the production of chemical solvents, that is to say, cracking gas, is based upon its fuel value at the refinery. The same applies to a large extent to stripped natural gas, although in many refineries the amount available is far in excess of requirements, with the result that, unless it can be sold for town gas enrichment or to neighboring industrial concerns, it is either burned or allowed to escape into the air.

For Chemical Synthesis

The petroleum industry has been slow to appreciate the possibilities of petroleum as a raw material for chemical synthesis, for it is only within the last 10 to 15 years that any progress has been made at all. The complexity of petroleum and the difficulty of separating pure products either for raw materials or as reaction products has tended to hold back development, particularly as little is still known of the chemistry of all but the simplest hydrocarbons. As a result, most of the industrial development has been based upon the simplest members only, very little new chemistry being required. Naturally, as these members are paraffins, the products so far available are chiefly alcohols, esters, ketones, ethers and chlorocompounds. Considerable work has been carried out on the conversion of the simple olefines into aromatic hydrocarbons, but with the possible exception of the suggested production of styrene and its polymers, these have been intended for fuel purposes solely.

While little is known of the form in which oxygen, nitrogen and sulfur exist in the crude oil, the view has been held for some time past, and included in a general discussion by Professor von Braun on the composition of petroleum, that complex bodies are present which break down under the conditions existing when petroleum is distilled to give the comparatively simple compounds which have so far been isolated from the distillates. As these compounds invariably impart some objectionable property to the product, it is necessary to remove or destroy them, a process in itself costing the oil industry an enormous sum annually. Sometimes these objectionable compounds can be recovered from the spent refining agent and usefully employed, this being particularly true of the naphthenic acids which form soaps possessing certain valuable detergent properties. In spite of considerable research, very little was known concerning the constitution of these acids until quite recently, when Professor von Braun set about elucidating their structure.

Sulfur Compounds

Little, if any, use has been made of the sulfur compounds, consisting of sulfides, disulfides and mercaptans, readily isolated from certain distillates. They have been suggested as rubber and cellulose solvents, but their extremely unpleasant odor is likely to preclude them from any such use. They are, however, useful as "stenches," which can be added to inflammable and poisonous gases of faint odor to indicate leakage.

Turning to the hydrocarbons themselves, very little indeed is known of them. Much earlier work on their isolation from petroleum and its distillates is of questionable value. The experimental difficulties were not appreciated, particularly the possibility of isomerization, and suitable equipment was not readily available. Nevertheless, Young and Markownikoff, to mention only two of the earlier workers, did isolate many of the lower hydrocarbons in reasonable purity, but it has remained to the Bureau of Standards in Washington to undertake the problem thoroughly and systematically. Aromatics have been isolated from the distillates from Borneo and Persian crude oils, but when the enormous possibilities are considered, the few hydrocarbons so far identified form only a very small percentage of those theoretically possible and probably present. As a general rule olefines are not present in straight-run distillate unless cracking conditions have existed in the still. When cracking has been employed, the number of hydrocarbons theoretically possible, even in com-

paratively low-boiling distillates, reaches an astonishingly high figure and, although a few of the simpler olefines and diolefines have been isolated, practically nothing is known of the composition of even low-boiling cracked distillates. Attention has therefore been focused on the gaseous hydrocarbons, both natural or cracked, as starting materials for conversion into chemicals and solvents. Natural gases, although essentially hydrocarbon, contain varying proportions of non-hydrocarbon gases such as carbon dioxide, nitrogen, oxygen, hydrogen sulfide, and occasionally helium, while those derived from cracking operations, besides containing unsaturated hydrocarbons, also contain hydrogen and possibly carbon monoxide.

Analysis of Unsaturated Hydrocarbons

The segregation of hydrocarbons in gaseous mixtures under analysis has been accomplished by Van Dyck, by taking advantage of their solubility in suitable solvents. The methods employed for the analysis of the unsaturated hydrocarbons are based upon their reactivity towards sulfuric acid in differing concentrations. This separates them into three groups: (1) tertiary olefines, the most reactive; (2) propylene, *n*-butanes, butadiene and similarly reactive olefines; and (3) ethylene. Bromine addition values or the quantitative examination of the homocompounds formed also yield valuable information as to the nature of the hydrocarbons present. Thus, butadiene is most conveniently separated in the form of its tetra-homide.

The separation of olefines from cracking gas on the large scale is most conveniently carried out by a modification of the sulfuric acid absorption method, the alcohol, or, if required, the ether, being recovered after suitable dilution from the acid by distillation. The whole problem of alcohol production is fully reviewed by Dr. Brooks, from the cost of raw material to the physical properties of the alcohols and esters and ketones which can be derived from them. The result of this development has been to make comparatively expensive or rare alcohols, such as *iso*-propyl, *sec.* and *tert.* butyl alcohols, available in enormous quantities at relatively low cost. So cheap, in fact, is *iso*propyl alcohol today that it is replacing ethyl alcohol for many purposes. It possesses a very definite advantage over its rival in that no excise restrictions are at present placed upon it; in fact, in certain formulae it can be used as a denaturant. Its chief uses include those of anti-freeze, dehydrating agent, surgical antiseptic, and solvent, while its replacement of ethyl alcohol in perfumery has been noted by several writers.

Production of ketones from secondary alcohols is a comparatively new development, the ketones obtainable in this way including acetone, methyl ethyl, methyl *n*-propyl, methyl *n*-butyl, and methyl *n*-amyl ketones. All form excellent solvents for nitrocellulose, judged both from the viscosity of the solution obtained and their tolerance for hydrocarbon solvents. They are also good solvents for linseed and tung oils as well as all the important gums and resins. Cellulose ethers, too, are also readily soluble in them. The higher ketones are poor solvents for cellulose acetate, but methyl ethyl ketone containing a small proportion of ethyl alcohol is a good solvent for all grades.

Theory of Molecular Hydroxylation

The mechanism of the direct oxidation of the paraffins has occupied the attention of a succession of eminent chemists for well over a century, and it has remained to Professor Bone and his collaborators to settle the question finally. These investigators were able to prove that hydrocarbons could be completely oxidized to steam and carbon dioxide only as a result of a number of stages during which the molecule underwent "hydroxylation." Experiments upon the slow combustion of hydrocarbons at temperatures between 300° and 500° C. showed definitely that alcohols, aldehydes and acids were formed in definite stages; owing to the large heat evolution involved, these were thermally decomposed. At the same time the operations themselves were fraught with danger owing to the explosive nature of the mixtures handled. Drs. Newitt and Townsend have succeeded in avoiding both of these difficulties by working with dilute mixtures, and have been able to isolate considerable yields of liquid oxygenated products in consequence. Thus, for example, in the oxidation of methane by employing a methane-oxygen ratio of 8.1/1 and operating at 166.4 atmos. pressure and 341° C., they were able to recover 22.3 per cent. of the methane burned as nearly pure methyl alcohol. Ethane/oxygen mixtures of approximately similar composition required a temperature some 80° C. lower for reaction, and the products included ethyl and methyl alcohols, acetic acid, formic acids, acetaldehyde and formaldehyde. In both cases the reaction is preceded by an induction period which may be of many minutes' duration, and during this time no perceptible chemical change or heat evolution occurs. It is particularly interesting to note that at a pressure of 100 atmos. ethane may be oxidized without the use of any catalyst other than the walls of the reaction vessel to give upwards of 60 per cent. of valuable liquid products, chiefly ethyl alcohol and acetic acid.

Other methods for obtaining oxygenated products, such as hydration and oxidation of olefines, are briefly reviewed and discussed. An interesting outcome of this work was a re-examination of Tizard and Pye's experiments on the ignition temperatures of certain paraffin air mixtures under pressures comparable with those attained in the ordinary gasoline engine.

Apart from oxidation, alcohols can also be produced from paraffin hydrocarbons by chlorination followed by hydrolysis. This method is referred to by Professor Nash and Dr. Bowen in their paper entitled

"Petroleum and Petroleum Gases as Chemical Raw Materials," a paper which forms a very valuable summary of the uses to which petroleum can be put as a chemical raw material. Mention is especially made of natural gas as a potential source of hydrogen, carbon monoxide-hydrogen, formaldehyde and acetylene. The dehydrogenation of paraffins to olefines and the conversion of the latter to benzene is also discussed.

Apart from alcohols, olefines can be made to yield another important group of solvents. Thus, ethylene reacts with hypochlorous acid to give the chlorohydrin a compound useful in organic synthesis, which on hydrolysis yields glycol or ethylene oxide according to the conditions employed. Both of these compounds have found practical application, the former replacing glycerol in the production of non-freezing explosives, while ethylene oxide is a useful insecticide. Heated with alcohols ethylene oxide yields a series of excellent lacquer solvents and plasticizers, the "Cellosolves" and "Carbitols" respectively. The former are the half ethers of ethylene glycol, while the latter are corresponding derivatives of diethylene glycol. An interesting by-product in the preparation of ethylene chlorohydrin is $\beta\beta$ dichlorethyl ether, the oxygen analog of mustard gas, which has proved to be a very useful selective solvent for the treatment of lubricating oils.

Oxidation of Higher Hydrocarbons

In conclusion, mention must be made of the products obtained by oxidation of the higher hydrocarbons. Drs. Newett and Townsend point out that with hydrocarbons of increasing molecular weight, higher aldehydes, acids, etc., are formed, with a corresponding reduction in the yields of formaldehyde. In the United States experiments have been carried out for some time past on the oxidation of kerosene and gas oil by the James and Penniman processes. The highly complex mixture of aldehydes, etc., obtained in the former of these has proved a useful denaturant. The oxidation of narrower cuts offers even greater possibilities, for the number of products which must be separated is then considerably reduced. Thus it has been pointed out that fractions containing *cyclo*hexane can be oxidized to give adipic acid, while the vapor-phase oxidation of toluene and naphthalene are well-known reactions. Again, fractions containing paraffin wax are stated after hydrogenation to give good yields of fatty acids on oxidation. At present most of these patented oxidation processes are based upon the exceedingly complex mixtures of hydrocarbons which form even comparatively narrow cuts. In the future, when fractionation has reached the point at which individual hydrocarbons can be isolated as raw materials and when the chemistry of these hydrocarbons has been worked out, no doubt oxidation processes will yield many useful and valuable additions to the lists of organic chemicals available to the manufacturers.

The Industry's Bookshelf

Quite naturally the business executive's suggested "five-foot shelf" is now crowded with books dealing with various phases of the "New Deal", sufficient time having elapsed to permit writing of a number. Outstanding in the group is:—

A Primer of "New Deal" Economics, by J. George Frederick, 322 p., published by Business Bourse, 80 W. 40 st., N. Y. City. $2.00.

As its name implies this book offers easy-to-read, full, authoritative and clear interpretive light on the entire "New Deal" principles, policies and measures. Not mere official detail, but broadscope explanation, up-to-date.

In its "Prologue" it briefly reviews man's economic history and then sets forth the 12 Leading "New Deal" Principles. Then it interprets with detail the main projects. Then it presents the philosophy, the basic idea, behind the "New Deal." After this come 3 chapters by the 3 men who shaped much of the "New Deal" (Baruch, Swope and Richburg). There is even a chapter of questions and answers.

The entire structure of the "New Deal" stands before you quite complete and rounded after you have read this book; a tremendously important, timely, needed volume for every citizen, business man, student.

The National Industrial Recovery Act, by Benjamin S. Kirsh in collaboration with Harold Roland Shapiro, 156 p., published by Central Book Co., 245 Bway., N. Y. City. $2.50.

This volume is a practical discussion of the industrial control provisions of the National Recovery Act. It supplements the author's earlier and more complete "Trade Associations: The Legal Aspects," dealing with trade associations under the Sherman Law.

The Inherent Function of Money, by William Brown, 114 p., published by McAllister Publishing Co., Chicago, Ill.

A breezy and very unusual attack on the problem of really explaining just what money is, and of even more importance, what it is not.

Being a Scotsman, the author is, of course, writing from a British point of view. However, his interest in world-wide social reform raises this book above any implied insular limits.

Whether you are a banker, economist, diplomat, business man or "forgotten man," this thought-provocative solution of our problems will prove of vital interest at this time when great changes in our social and business structure are taking place.

Industrial Chemistry, by Emil Raymond Riegel, 784 p., published by The Chemical Catalog Co., 330 W. 42 st., N. Y. City. $6.00.

One very obvious advantage of this work in the first edition was the fact that it was contained in one volume whereas most other works of a similar nature were not. As a textbook this is a decided advantage. In the 2nd edition, although greatly enlarged and completely re-edited to bring the pages up to date with modern industrial chemical practices, the author has managed to keep to one volume. In many other ways, including many more illustrations, the new edition is an advance over the 1st. New edition should prove even more popular with professors of chemical engineering courses.

Evaporating, Condensing, and Cooling Apparatus, by E. Hausbrand, 503 p., published by D. Van Nostrand Co., 250 4th ave., N. Y. City. $8.00. Translated from the German by Basil Heastie.

A detailed explanation of this standard work is unnecessary. It is accepted as authoritative on the subject of heat transfer. Present (5th edition) has been printed to permit text to be brought up-to-date with the latest experimental and theoretical work on heat transference carried out here and abroad.

Plant Maintenance Recording

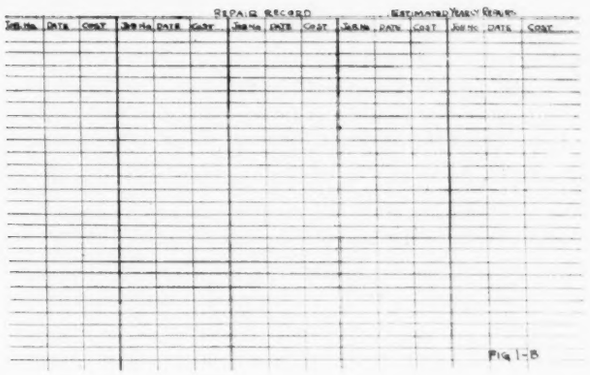


Fig 1-B

By Robert L. Holliday

THE functional activities of many maintenance engineers is so often taken up with plant problems for future developments that the present is often overlooked in the stress of planning, where the present is, in most cases, worthy of equally as intensive study.

The choice of installation may be subject to criticism from a plant standpoint due to unfair prejudices set up by the mechanical forces which may be entirely due to carelessness on the part of operators or, on the other hand, it may inherently lay in the choice of machine or manufacturer. It has always been my belief that proper maintenance is obtained by looking into the future rather than waiting for something to break and then repairing it. In order to do this, however, there must be a proper means of orderly procession in records, and of such progression a simplification such as to not involve an unnecessary cost in obtaining the proper records. If these records are such that they can be kept up-to-date readily, they should be of immense value in both judging the value of the machine in question and they may also be a means as to predicting when repairs may be expected. By a little judicial reasoning, the possible break-down may be averted and the necessary repairs made in time to keep maintenance at a minimum, and without loss of operating time.

It has often been the case that a certain machine, which although it may function on the same general line, may not be at all the type for the particular work. For example, there are many types of mills for grinding materials, but very often there is one particular mill that will do the work on one particular material, at less cost, particularly in maintenance, than some other mill which, however, is functioning apparently satisfactorily on another material. A study of repairs

LOCATION _____ MAINTENANCE APPARATUS RECORD WORKS _____

NAME OF APPARATUS _____ APPARATUS NO _____

MANUFACTURER
TRADE NAME
SIZE, SPECIFICATION, ETC.

CAPACITY
SPEED - DRIVE SHAFT
PULLEY & SIZE OR DIRECT CONNECTED
HORSE POWER OR MOTOR & CHARACTERISTICS.
HORSE POWER OF AUXILIARIES.
GUARANTEE -

BLUE PRINT FILE NO.		
REQUISITION NO.		CHANGES FROM APPARATUS AS RECEIVED.
ORDER NO.		
COST DELIVERED		
COST INSTALLED		
ESTIMATED YEARLY REPAIRS.		SPARE PARTS.
WEIGHT		
DATE INSTALLED		
DEPRECIATION %		
REPLACED BY APPARATUS NO.		
REPLACEMENT DATE & WHY		

Fig 1-A

will often bring out the fact that something is inherently wrong in the choice of that particular machine for that particular job.

Several times I have had an opportunity to investigate complaints of break-downs in apparatus, where a record of repairs would have immediately shown that there was something radically wrong, and instead of continuing with the particular piece of apparatus, it would have been cheaper to have scrapped it some years before and have installed some other type.

Almost any good master mechanic can repair a break-down, but how few can anticipate one? This is not, however, a severe criticism of the master mechanic as his function is more mechanical than it is in future prognostications. The maintenance engineer, however, should be responsible to a great extent, as it is in his province to be able to keep the necessary records so that it is not a matter of guess work, but a function of orderly procedure.

As to method, the first step I believe lies in numbering all apparatus with a metal tag so as to have a permanent identification. I do not believe that this should apply to every piece of apparatus, however, as there are many pieces that are relatively unimportant on account of their initial cost; nor do I believe it should apply to connecting piping or valves, unless of exceptional value, but it should record everything of a moving nature where maintenance is expected as a result of friction. It may also apply to vessels which do not have moving parts, but which may deteriorate due to erosion or corrosion.

The first step would be the record card as shown in figure (1-a). You will note that on the front of this card there is a notation for all the pertinent information necessary for an intelligent record of the apparatus as originally installed. This information is also invaluable in the case of spare parts or possible replacements and will often take care of possible

YEARLY CHRONOLOGICAL RECORD — YEAR

DAYS OUT FOR REPAIRS

APPARATUS No.	JAN.	FEB.	MCH.	APL.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

Fig. 3

confusion where certain changes have been made after purchase and during original installation. It often occurs that minor adjustments involving changes are made which the manufacturer can easily make at his shop, if he knows what is required.

Figure (1-b) shows the back of the card, which is a permanent record of maintenance costs and a history of the apparatus. Needless to say, one card is allocated to each piece of apparatus on which it is proposed to keep a record of performance.

With this record, there is also a tie-in with the plant record as to cost which is shown in Figure 2.

I believe this form of job order is worth while as it involves a momentary pause in its issuance where some thought at least must be given as "why" rather than a rubber stamp issuance accompanied in many cases by a grand gesture. There is a most necessary space for "estimated," both as to days required and as to "material and labor." This in itself is no more than the average engineering department is doing every day and should involve no hardship as planned.

The supervisor who may or may not have been advised by the maintenance engineer, makes out the job order in triplicate, filling in "apparatus no." and "date" issued, and forwards to the master mechanic

START WORK _____ JOB ORDER DATE ISSUED _____

APPARATUS NO. LOCATION JOB NO

WORKING DATES	8 HR DAYS	HRS O'TIME	BILL OF MATERIAL	$ MATERIAL	$ LABOR	$ TOTAL
ACTUAL						
ESTIMATED						

Fig. 2

REQUISITION No. _____ SUPERVISOR _____ DATE

" " _____ MASTER MECHANIC _____

" " _____ MAINT. ENGR. _____

This may be made up in pad-form with carbon inserts or backing.

E = ESTIMATED
A = ACTUAL
D.R. = DAYS RUN

SCALE 0 100 200 300 400 500

YEARLY MAINTENANCE RECORD

APPARATUS No.		YEAR	DR	YEAR	DR	YEAR	DR	YEAR	DR	YEAR	DR	YEAR	DR	YEAR	DR
	E														
	A														
	E														
	A														
	E														
	A														
	E														
	A														
	E														
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	A														

FIG. 4

who fills in the job number, the estimated time required, and gives the "bill of material" of material required and signs. The triplicate then goes to the maintenance engineer who estimates the labor cost and the material cost and then looks at his records of the apparatus in question. With the proper forms kept up-to-date, he can see at a glance when the last repairs were made and what they cost. If there is a regular chronological record of repairs, he has the opportunity of making an analysis, but in any event, he will have more or less of a prediction of when to expect another break-down. If these occur frequently, there may be something inherently wrong. There may be one part slightly over-stressed which may be replaced by a stronger member, or it may be that the service is entirely too severe, and a more rugged piece of apparatus necessary. In any event, the forms will show at a glance a progressive and orderly history of the piece of apparatus. This can then be translated into a report, which is based on dollars and cents.

To do this, I would suggest the use of cards as shown in Figures 3 and 4. Figure 3 is a chronological record card on which are entered all apparatus numbers of apparatus that are shut down for repairs and the days each month. This card will show at a glance what particular pieces of apparatus are interfering with production and gives also an expectation of how long the intervals are between repairs. This will allow a planning and also is a check on both the operator and the master mechanic. It may be that the operator needs proper instruction, that the repairs are made improperly, or that there is something radically wrong. If such an occurrence happens at regular intervals, it may be possible to anticipate shut downs by repairing at a planned interval where shut-downs will not interfere so much with production.

Figure 4 is a yearly record maintenance card where actual versus estimated records may be kept and a glance will enable one to ascertain whether a piece of apparatus is standing up under the ravages of time and production. This record also should show the "days run" which will give a true indication of the relation between repairs and the time in service. The record may be kept by numerical dollars (omitting cents and figuring to the nearest dollar, or it may be plotted by using a scale of dollars).

I do not believe that the use of such records as have been described is placing any undue hardship on a maintenance engineer, and I believe that any plant will materially benefit by such records.

There is also another point which I might bring up where these records are invaluable, that of expansion.

There are many times when an expansion program is contemplated, where it is difficult to get a true picture of apparatus as installed. Very often when an unavoidable repair has just been made, an inquiry will elicit from the operating man, a more or less prejudiced criticism of the apparatus, where a record will show at once whether this criticism is justified or whether he is just looking down his nose as it were.

By analyzing the cards, the design engineer has a true picture of troubles and whereas things may not be to such a point as to actual replacement of the installed apparatus, it may give an indication that a different piece would be justified, or the information may be recorded and the matter taken up with the manufacturer, who is then able to take steps to remedy any weak points on future apparatus.

Chemical Business from the Economic Point of View

By L. M. Bernard

(Translated and adapted from "Chimie et Industrie" by Joseph Kalish)

INCREASING volume and variety of chemical production, entering into ever-widening fields of human activity, have given rise to the important modern study—chemical economics. This is the science which studies the effect of scientific advance upon economics and, conversely, the action of economic factors upon chemical industry.

Little has been written on this subject in France, although C. Colson in his "Cours d'économie politique" has translated and graphically illustrated some of the material described by Tyler in "Chemical Engineering Economics." In the United States, contributions to the general subject by Williams Haynes and J. E. Teeple have appeared.

Germany, however, has produced the largest amount and most important work in the field. This is a more or less natural consequence of the conceptions of a national economy formulated by List in 1841 in his "National System of Political Economy." Through his writings rose much of the industrial organization and political and economic thinking of modern Germany. The latest work is R. Koetschau's "Introduction to Theoretical Chemical Economics" published in 1929. Previous studies are those of Dyes, "Handbook of World Economic Chemistry," 1920; D. Waeser, "The Works Chemist," 1921; Parnicke, "Machinery of Chemical Technology," 1922; works by Kretzschmar, Bernthsen and Gutbier in 1923, and by Jastrow in 1924; and the standard book by Sulfrian, "Textbook of Chemical-Technical Economic Theory," 1927.

Factors in Chemical Economics

Chemical economics embraces the equilibrium of three elements at a given time and in a single place. These factors, adopting the notation of Koetschau, are economic, scientific and technological.

1. All economic phenomena influenced by the technical application of chemical progress, or conversely, directly or indirectly affecting or motivating industrial chemistry, may be included in the economic factor of chemical economics, symbolized by the letter E.

2. All chemical reactions and processes whose technical application have a possible bearing on the economic life of a people constitute the scientific factor in chemical economics. Call this factor C.

3. The technical factor, defined by T, includes technical and engineering aspects of the practical, industrial application of chemical reactions, new and old.

Factors Subject to Possibility of Quick Changes

In spite of their general dissimilarity, these three elements have at least one important property in common: they may vary greatly within a short time. Economic changes (E) in consumption, influenced by a great variety of causes, will transform or accelerate the demand for chemical products. As examples, war is most important in accelerating chemical demand and, indeed, in changing the character of demand; style changes call for different dyes, different textile materials, new building materials; impatient demand for automobiles requires new lacquers, etc.

On the other hand, the development of practical plastics has virtually set new styles for many articles in common use; a technical change in the production of a well-known chemical material may lower the price sufficiently to start a train of new uses; while fixation of air nitrogen is not too indirectly responsible for financial difficulties and revolution in Chile. Yet the same process renders war-time blockades less effective.

The progress of chemical research (C) modifies the conditions under which raw materials are treated or enter into a reaction. At present there is much interest in applications of thermodynamics and catalysis. Technology (T) improves the means of

production being used and makes many laboratory investigations economically feasible, as in the development of equipment for high pressure operations.

Because each of these factors is in itself highly dynamic, any balance established among all of them is necessarily temporary, of comparatively short duration. And from well-known laws of equilibrium, a shift in one component will result in movement of the others if a new balance is to be reached.

The Economic Factor "E"

The strictly economic elements in chemical economics thus operate upon chemical science and technology and in turn are influenced by them. Much has been written about the effect of both science and technology, but let us consider the economic properties of the chemical industry. These can conveniently be divided into commercial, financial and sociological properties.

Chemical markets are quite individual. Intervention of the factors T and C may change their character completely. Potash was at one time a producers' commodity, now it is most important in its direct consumption for agricultural purposes. On the other hand, petroleum products once exclusively bought for direct consumption are now extensively utilized for the manufacture of chemical products. Quite frequently this type of change in the character of the use for the material is brought about by lowering of price independently or along with scientific advance and technical development of new uses.

Monopoly is another quality of chemical markets. Many important chemical raw materials are found in only certain locations, leading to a natural monopoly. Patent protection also confers monopoly powers over new products or new processes for known materials. Yet these monopolies differ from the usual conception because of the rigid application of an important economic law, the law of substitution. In very many instances a possible substitute is standing by, awaiting a proper price differential to step in and take away part of the monopoly market. Monopoly is compelled to avoid too much greed, for a proportion of lost trade is usually permanently lost. In addition, high monopoly price encourages chemical research for synthetics and good substitutes.

Chemical Monopoly

Chemical monopoly, depending upon patent protection, is costly. The first period of research, in private, corporation, or academic laboratories is expensive and frequently based upon only hope and enthusiasm. Commercial results can never be guaranteed. Successive stages of semi- and full-plant scale experiment cost even more and are again without positive guaranty. Finally, more often than not the market must be created for the new finished product. The average consumer (who accounts for volume of trade) "must be shown" before he will undertake innovation. Publicity and educational campaigns follow and frequently include more research to develop uses for the product. With luck and persistence, then, the monopoly may repay the first investment and provide good profit during the remaining life of the patent, or until another chemical product replaces it.

Chemical industry, unlimited with respect to technical factors of production, is dependent upon availability of capital and raw materials and upon the size of the market.

Disregard of the last factor causes serious trouble. Manufacturers strive to increase consumption by reduction of price, not with price-war in mind, but only in accordance with the known fact that price reduction leads to increased consumption. Unfortunately, others may get the same idea simultaneously, and over-production for a saturated market will result.

Chemical industry, due to the comparatively large size of its individual units, generally avoids these disastrous misunderstandings. The French word "*entente*" is nicely expressive of customary agreements in price, production, and markets. No *entente*, however, can predict scientific and technical progress, or do much about the encroachment of new competition based upon such changes.

Large Investments Usually Necessary

Financially, the chemical industry also has its unique characteristics. The only immediate check to chemical production is the scarcity or total disappearance of new capital, while the efforts of chemical industry to pay for the use of capital are directed toward maintaining the balance between production and consumption. That these equilibria are generally stabilized is indicated by the fact that virtually no serious losses have been sustained by investment in chemical production. However, this element of safety is balanced by the relatively low rate of return for investment in the industry.

Chemical production units are usually large, requiring large investments. In the first place, equipment is very costly, generally designed for a specific task, stationary, and subject to high rates of depreciation. The factor of obsolescence is also inordinately large. Thus a significant portion of the original investment is inevitably frozen. A further amount must be expended in setting up and maintaining adequate research facilities. Research is the double-acting force causing, yet averting the consequences of obsolescence of processes. Yet only the most far-sighted management can long resist temptations to reduce research budgets when depression reduces profits.

All in all, therefore, a comparatively small proportion of total capital available for chemical manufacture can be utilized for the turnover which brings in profit. That profit has been as large as it has been

can be directly traced to the balancing effect of monopoly and price control common in the industry.

Sociologically, a fundamental aspect of chemical industry may be called its democracy. The proportion of technically trained men in the industry is very high, while unskilled labor is little used, being in large part replaced by mechanical equipment. Few tasks have the deadly routine common in fabricating industries, workers retain individuality and have a good idea of the importance of their efforts in the general production scheme. Because responsibility is so definitely placed, rewards are direct and advancement the result of merit, for merit soon becomes obvious. All of these elements result in a spirit of cooperation, a true "happy industrial family" operating with highest efficiency. This harmony is clearly evident from the rarity of conflicts between capital and labor in the chemical industry, as shown by the almost complete absence of strikes in its history.

The Chemical Factor "C"

The chemical factor C of chemical economics is its scientific component; it is engendered by new knowledge and theory of the cause of natural phenomena. An invention appears in three forms:

1. By the discovery of new facts which industry utilizes for new manufacture and the most efficient use of natural wealth.

2. By the creation of processes whose use in factories lower costs and better qualities.

3. By recommending methods of operation which lead to greater efficiency.

The factor C is, of course, exclusively expressed by the laboratory.

Its first division is exceedingly broad, for we realize more and more that all scientific study has its potential value in filling human physical needs. It is wise to remember Faraday in this connection. Showing his first dynamo to a visitor, he was asked, "What use is it?" His classic answer, "What use is a child?" Purely out of scientific curiosity, Bayer determined the chemical structure of indigo; almost as a matter of course its technical synthesis followed. Haber, testing some of Nernst's thermodynamic study, investigated equilibria in the decomposition of ammonia; excess production of synthetic ammonia is now a distressing fact the result of too little attention to the economic factor E, or rather, its neglect for national political reasons.

Moreover, the sharp line of demarcation between scientific and industrial chemistry has disappeared. Where formerly scientists were dismissed as wholly impractical, and technical investigators considered only as hacks, collaboration is now almost complete. Industry fosters Langmuir. Science searches the patent literature for records of research. Pure scientific investigations are now very rapidly applied to industry.

The creation of lower cost processes is a familiar story. Solvay replaces Leblanc for soda ash; electrolysis replaces Weldon and Deacon for chlorine; natural phenol is supplemented by the product of two syntheses, etc.

pH Control

Another aspect of new processes is new means of chemical control, of which pH is a good example. Control permits the technical operation of many processes which were formerly carried on only with great difficulty even in the laboratory.

Finally, efficiency of operations is promoted by the application of chemical knowledge. An outstanding example lies in the utilization of fuels. This type of investigation also directs the choice of either iron pyrites or sulfur, either contact or chamber sulfuric acid, anhydrous or aqueous ammonia, etc.

Technology

And when the laboratory has done its work, technology assumes its important duties in the technical factor "T," and here we include even more than the very important application to practice of chemical research. Many important aspects of operation and all the problems of maintenance are part of the factor.

This field comprises all the comparatively minor changes in equipment which replace older tools by modern ones and bring higher efficiency. Of more striking importance are changes involving complete unit operations, where the continuous filter or autoclave or molding machine replace the discontinuous, simultaneous lessening operating charges and increases productive capacity per unit of investment.

Finally, technology builds new equipment for new processes. The present development of high pressure equipment, as an example, began with the first needs of ammonia synthesis. The problem was not only one of size and thickness of wall; it also necessitated studies of material and its resistance to the simultaneous actions of high pressure, temperature, and corrosion. This same investigation continues, but success has already gone beyond the original ammonia to synthetic alcohols and new gasolines. A subsidiary development is the use of high pressure equipment in the transportation of several chemicals. Moreover the technical factor in chemical economics is not restricted to chemical industry; continuing the same example, metallurgical research for high pressure alloys has resulted in the application of these and others in non-chemical industry. The link between the original electrolytic processes for the production of aluminum and magnesium and the present development of air transportation is a direct one.

Keeping in mind the factors E, C, T, and their movements, independently and in relation to one another, we can far better study causes and effects in chemical industry and in general economic movement.

Cold Road Tar

New German Specifications

By Dr. Mallison

IN GERMANY we understand by the expression "cold tar" a road tar which, by the addition of an easily volatile solvent is diluted to such an extent as to enable it to be laid in liquid form at the usual temperature. Certainly tar emulsions are also cold fluid, but the cold fluidity of these emulsions is achieved by the tar, as an emulsoid, being distributed in the finest droplet form in water acting as a continuous medium. Whereas tar emulsions lose for the most part their water and become agglutinative through breaking and also through vaporization of the water, the cold tars acquire their binding qualities only through the vaporization of the easily volatile oil which is added. Aqueous cold tars have also existed, containing a certain amount of water as well as the easily volatile oils, but they represented intermediate links between the genuine cold tars and the water-in-tar-emulsions, and they have vanished from the market.

Strictly speaking, one should understand by a cold liquid binding material, a substance which can be applied to the street, laid on and sprayed, without heating at any temperature, *i. e.*, in any season. Such a demand is not easy to meet. This degree of fluidity can, of course, be obtained without difficulty either by selecting a thin fluid starting tar, or by adding to a viscous tar very considerable quantities of solvent. Both methods, however, have their drawbacks.

A cold tar proceeding from a thin fluid tar obtains the binding power sufficient to bind the stone only after too long a time has elapsed. Cold tar with much solvent contains little binding substance and is also relatively expensive. It was a question then of finding a middle way. Development follows two different courses. Either a cold tar is prepared, which in summer possesses the correct thin fluidity, but which must be heated up a little in cooler seasons, or two kinds are placed on the market—a thin liquid and a more viscous kind, which are applied according to the season. It will also depend on whether or not the consumer possesses spray devices capable of being heated. According to circumstances he will decide on the cold tar which can be heated, or on the thin fluid cold tar. It also makes a difference whether the cold tar is to be used merely for painting damaged places or for surface tarring with spray devices, or for the manufacture of tarmacadam by shovelling together, or in mixing machines.

Thus the whole question of viscosity of the cold tars cannot be answered simply by saying the cold tar must always be essentially thin liquid. Allowance must be made here for economic considerations, the peculiarities of the application, and finally the respective purposes to be achieved.

Naturally a high degree of fluidity of the cold tar can be arrived at if a very rapidly boiling and vigorously liquefying solvent is used; preparations of this nature are also on the market and enjoy extensive application. They possess the drawback, however, of being very easily inflammable. Despite the fact that they are really not to be heated, there remains the

	Cold Tar I	Cold Tar II
Viscosity in the road tar consistometer (nozzle 4 mm.) at 30° in secs.	**under 20**	**20-150**
Water, not more than per cent. by weight	**0.5**	**0.5**
Heavy oils and anthracenic oil together at least per cent. by weight	**16**	**16**
Pitch residue, converted to 67° m.p., at least per cent. by weight	**40**	**50**
Phenols, not more than per cent. by volume	**3**	**3**
Naphthalene, not more than per cent. by weight (incl. analyt. approximative limit)	**3**	**3**
Crude anthracene, not more than per cent. by weight (incl. analyt. approximative limit)	**3**	**3**
Free carbon within per cent. by weight	**4-16**	**4-16**
Flash point (Pensky Martens)	**To be stated.**	
Content of ash, not more than per cent. by weight	**0.5**	**0.5**

danger of their being heated in case of need, or inadvertently coming into contact with fire, owing to carelessness. Hence selection of a cold tar specification generally, of necessity, amounts more or less to a compromise.

Still another point must play in the preparation of a cold tar, apart from viscosity and inflammability, and that is the question of whether one desires to bind stones, *i. e.*, repair a hole or prepare a tarmacadam, or to carry out the restoration of an old tarred surface. In the first two cases it will mean a high content of vigorously binding substance, *e. g.*, an agglutinant pitch. In the last one, however, it will depend on a certain content of tar oil which is able to soften and make the hardened layer of tar pliant again. Both spheres of cold tar application have gained great importance in Germany.

Cold Tar Quality

If we summarize the foregoing, it will be evident that laying down clear simple rules of quality for cold tar is fraught with unusual difficulties.

If we examine the table given in detail we see at first a fundamental separation of a thinner kind (I) and a thicker kind (II). The measuring of the viscosity proceeds with the consistometer at 30° in the same way as with the German hot tars; as however the 100 mm. nozzle would cause a too rapid and inaccurate reading of the cold tar discharge, a nozzle of 4 mm. diameter has been inserted in the consistometer for this purpose, and we then receive second values which are easy to read. The limit thin fluid, viscous, has been laid down at 20 secs. In order to make clear to the roadmaker the meaning of these figures, it should be mentioned that a distance of 20-150 secs. with the 4 mm. nozzle corresponds approximately to a distance of 1-5 secs. with the 10 mm. nozzle. The more viscous cold tar would accordingly be approximately as viscous as the thinnest standard hot tar. The limit of 20 secs. was so selected from practical experience, because cold tars can be sprayed with this or with a lower viscosity even at cooler temperatures without heating, whereas cold tars whose viscosity lies considerably above 20 secs., require heating up to 30-50° in cool weather.

With regard to the distillation limits, the statements in the table have been kept intentionally brief and vague as the tar maker must be granted a certain liberty here. The variety of the solvents naturally forbids more accurate statements. The figures for oils, pitch residue, phenols, naphthalene, crude anthracene and free carbon have, therefore, only been put forward to demonstrate the combination and to prove that a good road tar served as a basis for the preparation of the cold tar.

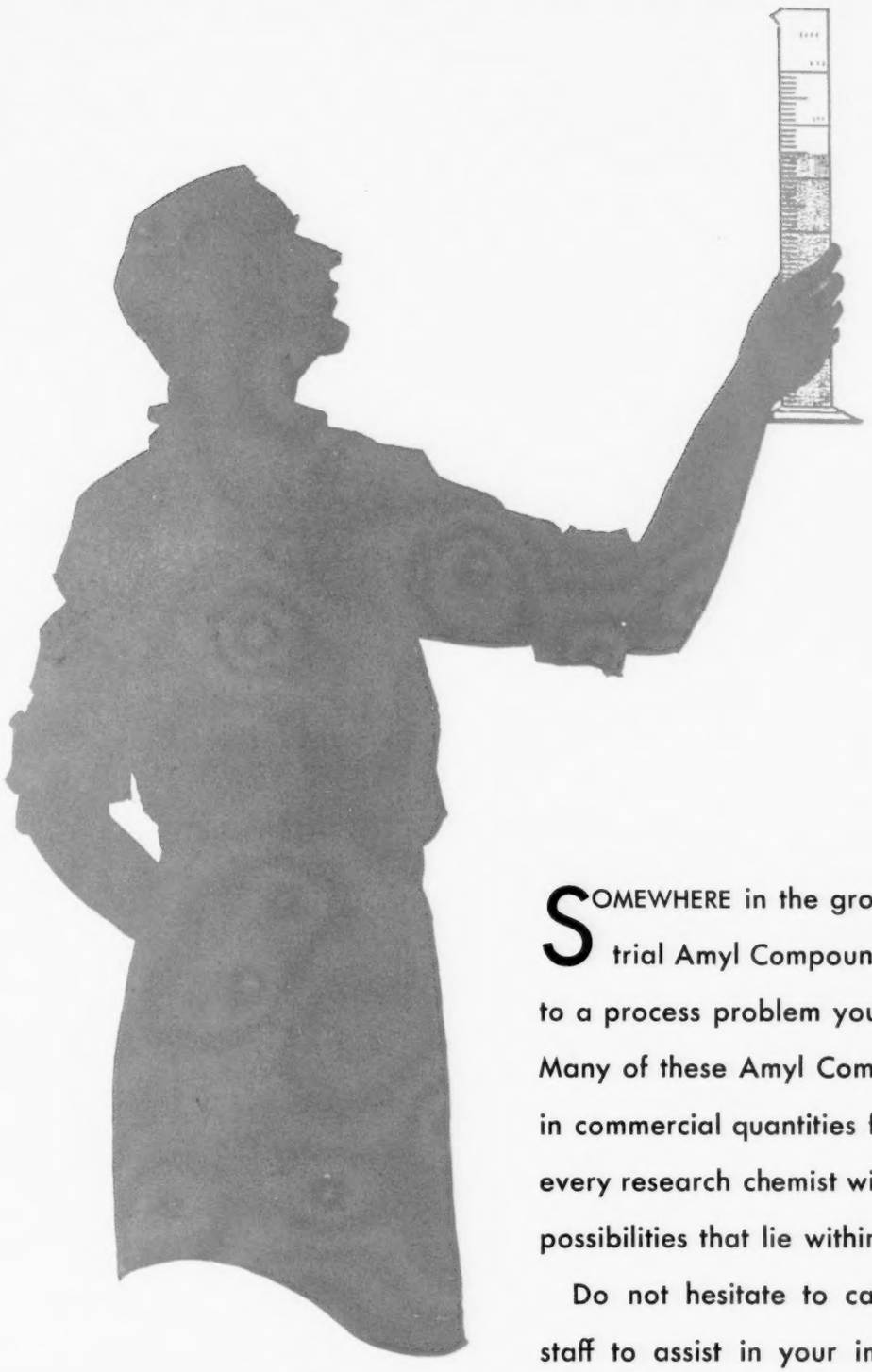
The determination of the flash point gives the analyst an idea as to the nature of the solvent and to the road maker a gauge as to the inflammability. The flash point must be determined in the closed crucible, Pensky-Martens apparatus, for when heating in the open Marcusson crucible very light parts of the solvent, such as carbon disulfide would vaporize even during the determining of the flash point. This would cause one to be misled into determining the flash point too high. In this case, the danger would be present in practice of explosive mixtures of air and solvent vapors forming in half filled barrels, which, when handled carelessly (lighted cigarettes, etc.) could lead to the explosion of the barrel. Experience has taught that a limit must be drawn at a flash point of about 30°; in cold tars having higher flash points danger is practically non-existent. If a Pensky-Martens apparatus is lacking, this can be shown in the following way. Fill a ¼ litre bottle about halfway with the cold tar to be tested, and leave the bottle standing, well corked, for about two hours. Afterwards draw the cork with the left hand and with the right dip a lighted match into the air-filled space above the cold tar. Observe when doing this whether a flash occurs or not. This test is perfectly safe.

Commercial Applications of Activated Alumina

Commercial use reveals that activated alumina will adsorb moisture from air and gases at practically 100 per cent. efficiency, corresponding to dew points below—60° C. During the period of complete removal of moisture, activated alumina will continue to adsorb at 100 per cent. efficiency until it has increased in weight to from 12 to 14 per cent. After complete removal of moisture, it will adsorb at lower efficiencies until a weight increase of between 20 and 25 per cent. has been attained. When the alumina becomes saturated with moisture it can be reactivated by applying heat at temperatures ranging between 175° and 315° C. After the moisture has been removed and the material is cooled again to atmospheric temperature, it is ready for further service on adsorption. This cycle of adsorption, reactivation, and cooling can be repeated indefinitely without any apparent deterioration or physical change in the properties of the adsorbent. The moisture-saturated, activated alumina may be reactivated by the application of heat. This may be accomplished in any of several ways, including the direct application of the gases of combustion, the use of imbedded electrical resistor elements, and steam or hot-oil coils.

In the atmospheric conditioning of industrial buildings, activated alumina finds one of its most attractive markets. The air in factories and process rooms often requires a definite moisture content for ideal manufacturing conditions. The means of supplying air with just the right moisture content, without the use of expensive refrigeration machinery, is a strong argument in favor of a dry adsorbent. Another direct application, along these same lines, is in the dehumidification and conditioning of atmospheres in storerooms and warehouses; for example, in the storage of plate glass where condensed moisture may cause an etching action, and in the storage of sheet steel which is subjest to corrosion and surface deterioration in moist atmospheres.

Activated alumina is particularly desirable for the drying of compressed gases. Through its use, oxygen, hydrogen, carbon dioxide, carbon monoxide, sulfur dioxide, chlorine, nitrous oxide, nitrogen, methane, butane, and helium may be completely dried, simultaneously with the removal of oil vapor, after the final stages of compression. For example, where hydrogen or hydrogen-nitrogen mixtures are used as atmospheres in annealing furnaces for treating metal sheets and metallic parts, it is necessary that the annealing gases be free from moisture to prevent corrosion or scaling.—*Abstracted from The Chemical Age.*



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CHEMICAL

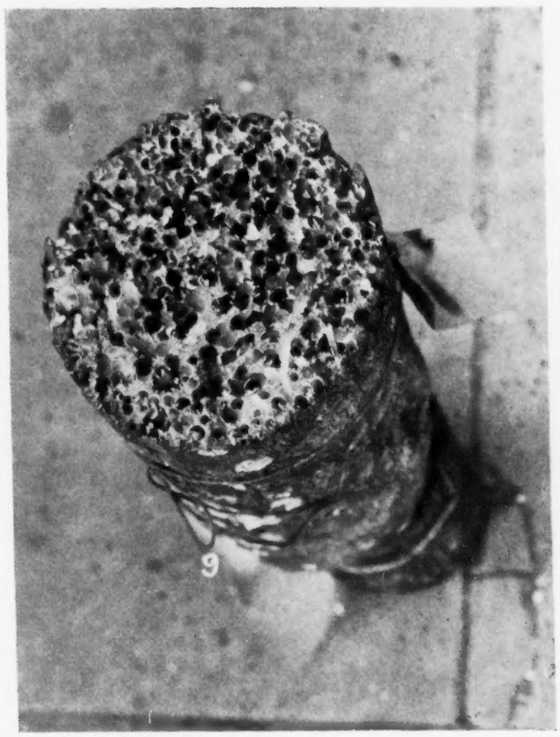
The Photographic Record

Left and right, two well-known chemical producers, Ault & Wiborg Co. and Arabol Mfg. Co., become chemical consumers in adapting new packaging ideas for their products.

Below, one of the special tank cars owned by the Catalin Corp. of America, for the purpose of shipping phenol. The cars are entirely nickel-clad, and each one has a capacity of 60,000 lbs. of phenol. Another feature is that they are provided with nickel coils at the bottom of the tank for pre-heating the material.

NEWS REEL

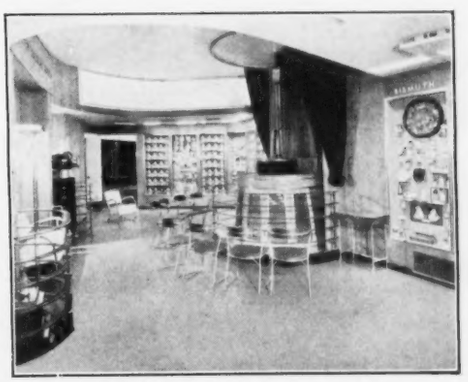
of Our Chemical Activities



A marine piling post, chemically treated, under observation by U. S. Chemical Warfare Service, in effort to discover suitable poison for marine borers.

Chemical industry will benefit from the proposed legislation compelling every vehicle to be fitted with non-shatterable glass. The windshield of this automobile is constructed of Pyralin sheeting.

Two photographs at right represent part of Mallinckrodt Chemical's exhibit at a Century of Progress. Top, medical exhibit featuring Mallinckrodt Ether; below, center of general exhibit — the spotlighted turntable where chemicals and their associated products pass before your eyes, while the Voice of Mallinckrodt tells their story.



Furnishings of room at left show the advance in modern chemical materials and their suitability for interior decoration. The walls, chair covers, curtains, lamps, and bridge table cover are all made of Cellophane materials. This room which may be aptly named the "Cellophane Room" is on view at the Du Pont Exhibit on the Boardwalk at Atlantic City.

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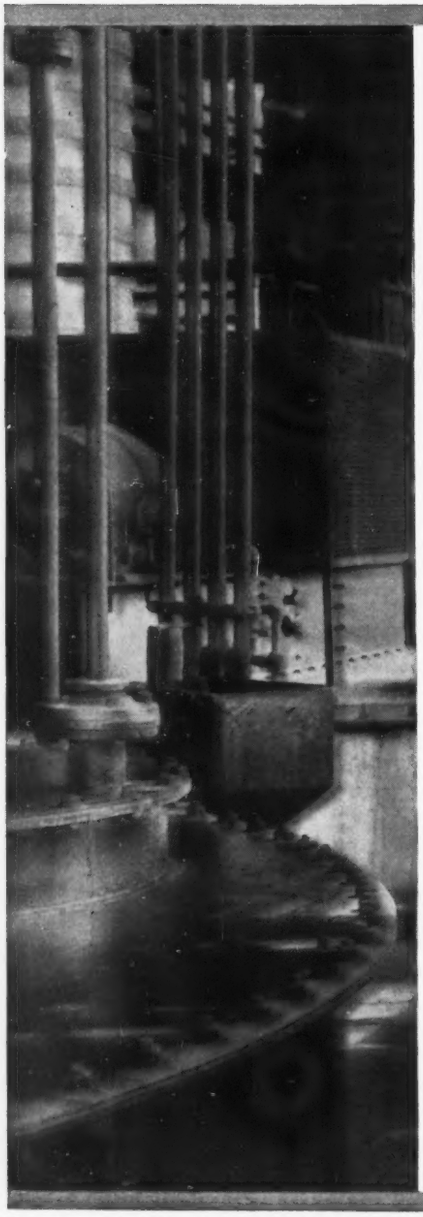

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Chemicals

Chemical Consumption

A digest of new products and processes in process industries for the user of chemicals.

Bleaching with Hydrogen Peroxide

By I. E. Weber, B. Sc.

Present-day production of hydrogen peroxide comes under two headings: (*a*) from barium peroxide; (*b*) electrolysis. The peroxide made by either process is entirely satisfactory for bleaching purposes. There appears to be considerable misunderstanding concerning the quality of hydrogen peroxide produced from barium peroxide. Fifteen to twenty years ago the quality of the hydrogen peroxide so produced was not altogether satisfactory. Before 1925, hydrogen peroxide from barium peroxide was only made by reacting on barium peroxide with sulfuric acid alone or in the presence of small quantities of phosphoric and hydrochloric acids. This process has been entirely superseded by the method described under Patent No. 252,768, the basis of which is the reaction between barium peroxide and phosphoric acid. Whereas in former processes the hydrogen peroxide and barium sulfate (blanc fixe) were produced simultaneously; by this new method they are produced in two separate stages. The hydrogen peroxide thus obtained is of much greater purity, is approximately 15 volumes strength, and is a very stable product. The low-strength hydrogen peroxide is then distilled to give a 30 or 40 per cent. hydrogen peroxide. The barium sulfate is also an immensely improved product.

There are three practical methods for the manufacture of hydrogen peroxide by electrolysis: (1) Electrolytic production of ammonium persulfate, its conversion by double decomposition into potassium persulfate, and distillation of the latter with sulfuric acid to give hydrogen peroxide. (2) Electrolytic production of persulfuric acid and distillation to give hydrogen peroxide. (3) Electrolytic production of acid ammonium persulfate and conversion by distillation to give hydrogen peroxide.

Owing to its freedom from impurities, a good stable hydrogen peroxide should not lose its oxygen on storage or unduly in the bleaching bath. An acid solution of hydrogen peroxide is more stable than an alkaline solution, and therefore all hydrogen peroxide contains a small amount of acid. Considerable improvements have been made in quality. Whereas in the British Pharmacopoeia in 1914 the limit of acidity is 10 and the solid residue as 1 per cent.; in the recent Pharmacopoeia, while no change was made in the limit of acidity, the solid residue was reduced to 0.2 per cent. A good grade of peroxide of hydrogen comes well within this specification, the acidity being of the order of one-third and the solid residue one-half of that allowed by the Pharmacopoeia. An indication of the remarkable stability of the hydrogen peroxide manufactured today is shown by the following figures:—

12-Volume Strength Hydrogen Peroxide

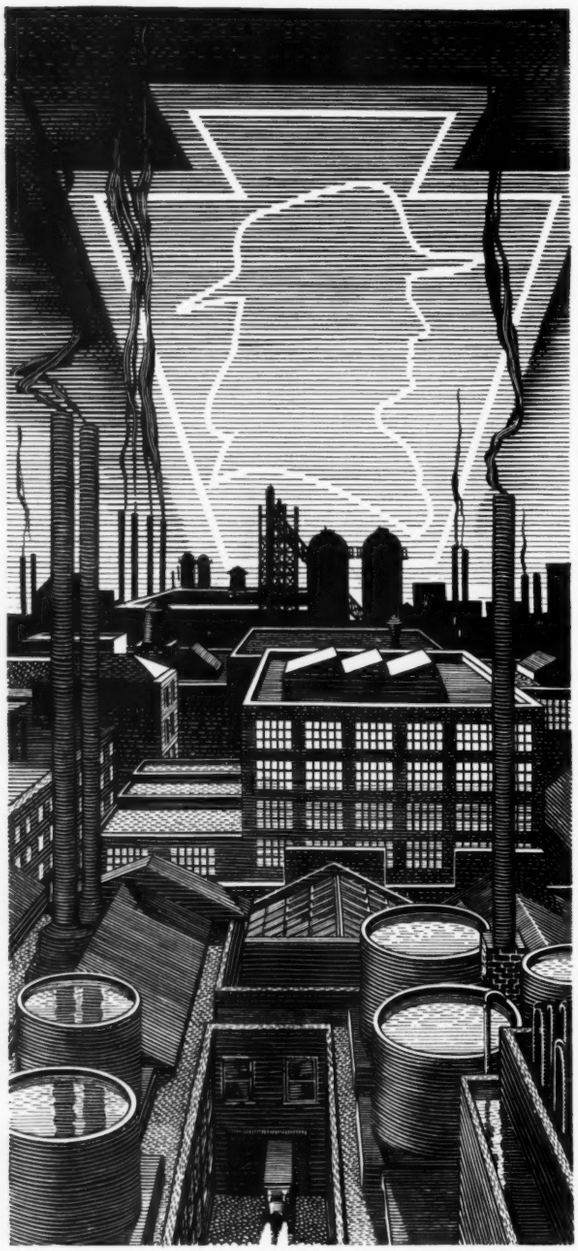
Number of samples examined	*Period of test*	*Average % loss of original strength*
217	12 months	0.5
188	2 years	1.4

The above stabilities were determined at room temperatures (15-20° C.)

Stability decreases with increase of temperature, but even so the quality is such that under tropical conditions the strength is very well maintained; at a temperature of 35°-40° C. over a period of six months, the loss is of the order of 2 per cent. of its original strength. Owing to the improvements that have been made in the stability of high strengths hydrogen peroxide, it is now possible to ship a satisfactory product to tropical countries.

The ideal bleach is one which will destroy the coloring matters, leaving the fibre unimpaired. Yarns or fabrics of yellow, brown, or grey color of good or poor quality are bleached successfully with hydrogen peroxide, which is more permanent than other methods of bleaching. Yarns originally yellow and grey bleached many years ago retain their whiteness, and have not returned to the yellow color, which would have been the case with stoved goods. The white is purer than that given with sulfur dioxide. A good lofty handle, free from wiriness, is obtained with a hydrogen peroxide bleach, and the goods retain their freshness during storage.

In the bleaching of wool, whether by the steeping or aging process, the cost is affected by the number of times the bleaching bath can be replenished. It is important that the accumulation of impurities should be kept at a minimum by employing as good a quality of bleaching materials as is possible. The water supply should be soft and preferably Zeolite-softened. Care should be taken that the water does not contain traces of copper. While iron, manganese, and chromium salts are not as deleterious as copper, they should be avoided. Silicate of soda is preferable to



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ammonia for neutralizing the bleaching bath. Silicates having ratios of $1Na_2O:3.2SiO_2$ and $1Na_2O:1SiO_2$ —viz., metasilicate, are now available, and comment on these is of interest:—

(*a*) The increase of the *p*H value of the bath to figures greater than *p*H7 means generally increased loss of hydrogen peroxide with a 1-volume and 2-volume bath, whether wool is present or not, and irrespective of the ratio of $Na_2O:SiO_2$ in the silicate used. (*b*) Generally wool stabilizes the bleaching bath, the difference being quite appreciable. This increased stability appears to be due to the reduction of *p*H number during the bleaching. (*c*) For a better bleach and economy of bath it is preferable to use a silicate of soda of the ratio $Na_2O:3.2SiO_2$ rather than water glass or metasilicate. The above conclusions are based on experiments using the three sodium silicates for neutralizing the bleaching bath, and cover a range of *p*H values of 7-12. The bleached wool obtained by the above method, if of insufficient whiteness, is given a sulfur stoving or a liquid bisulfite after-treatment.

Where an enhanced white is required, excellent results can be obtained by using a hydrogen peroxide bleaching bath, to which has been added pyrophosphate of soda and sodium oxalate or oxalic acid. As far as the writer is aware this is a new departure in bleaching wool, and gives results obviating the need for subsequent stoving or bisulfite treatment. The method is mainly applicable to the steeping process, and this combined stabilizer and neutralizing agent is marketed as Stabilizer C, and is recommended for use as follows:—

The hydrogen peroxide bath is made up as a 1- or 2-volume bath, depending upon the degree of white desired. Five and one-half pounds of Stabilizer C is added for every 100 gallons of the bleaching bath, irrespective of the volume strength of the bath. The bleaching is carried out at a temperature of 120° F., and it will be found that less time is taken for the bleaching than is the case with baths neutralized and stabilized with silicate of soda or other reagents. In replenishing the bath the hydrogen peroxide should be estimated by the iodine method. The addition of further quantities of Stabilizer C is determined by the use of phenolphthalein, the bath being adjusted to faintly alkaline to this indicator. Silks which do not lend themselves readily to a peroxide bleach where silicate of soda is added give excellent results with the addition of Stabilizer C.

As the bleaching of wool and wool union goods is usually carried out at a temperature of 120° F., it is necessary to heat the bleaching bath, and this can be done by a lead coil where silicate of soda is used as the neutralizing agent, but in the case of Stabilizer C it is necessary to use a coil made of Staybrite, such coils being covered with a false bottom. In addition to such inert materials as glazed brick, slate, stoneware, Staybrite and Monel metal are recommended.

Peroxide Baths and Weather Conditions

In the hosiery trade it is customary to render the goods unshrinkable before bleaching, and this is done by means of sodium hypochlorite and hydrochloric acid, any excess chlorine being removed by a bisulfite treatment. The goods after such treatment usually contain free acid, and it is necessary to make allowance for this by either neutralizing before bleaching or adding extra alkali to the bleaching bath. This also applies to hydrogen peroxide bleaching of carbonized wool and blankets which have been milled in an acid medium.

There is a tradition that in stormy or thundery weather peroxide bleaching baths may "go off." There is no evidence that such decomposition of the hydrogen peroxide is due to atmospheric disturbances. Thundery and humid weather go together and produce conditions which encourage the growth of bacteria in scoured yarn or fabric, especially when they are allowed to lie in a damp condition for an undue length of time. Wool, containing bacteria, when immersed in the bleaching bath causes rapid decomposition of the hydrogen peroxide, although the bath was perfectly stable before the addition of the wool. Under these conditions no bleaching of the yarn takes place, and delicate materials may be damaged. While this trouble rarely occurs, it is possible to overcome it by passing the yarn through a weak sodium hypochlorite bath which need not contain more than 40 parts per million of available chlorine.

Before bleaching silk with hydrogen peroxide, it is necessary to remove the sericin by degumming. There are on the market specially prepared degumming materials, which usually consist of sodium silicate and a sulfonated castor oil. Generally, however, olive oil soap with or without the addition of alkalis is used.

Progress in Cotton Bleaching

The development in the bleaching of cotton with hydrogen peroxide has become a possibility owing to the improvement in the quality of the latter, the advance in the technique of hydrogen peroxide bleaching and the use by suitable treatment of iron kiers, thus obviating the necessity for the replacement of existing plant. Rapid strides have taken place in the bleaching of American cotton, as this is easier to bleach than the Egyptian variety. It is necessary to give some cottons a preliminary boil. Generally a single hydrogen peroxide bleach is sufficient to give the desired white. On the other hand, it is sometimes necessary to follow the preliminary boil with two peroxide baths, the first being of a lower strength than the second. This is especially the case with Egyptian cotton, the first bath functioning as a desizing bath. Cotton is bleached by the hydrogen peroxide process on an extensive scale, both for whites and subsequent dyeing and printing. *From paper read to the Textile Institute Annual Conference in London.*

Crepe Finish for Rayons

Process is described for creping rayon fabrics by means of a bath containing one gram of soda ash and five grams of soap per liter, also in a bath containing caustic soda 12° Tw. and one containing cold caustic soda 32° Tw. Various combinations of treatment are also described. Creping by means of soap alone does not produce so great a shrinkage as when a caustic alkali treatment is used either before or after the soap bath. The dilute alkali is more effective as regards shrinkage than is the strong alkali, and the latter tends to give the fabric a harsh handle and uneven dyeing properties. Alkali treatment also results in a finer crepe appearance. Experiment has shown that the nature of the shrinkage produced by a dilute solution of caustic alkali is not the same as that given by simple immersion in a soap bath. Alkali treatment involves added cost in the process and may give a harsh handle which must be corrected by stretching during finishing. The viscose rayon fabric becomes somewhat pulpy during the alkali treatment, and hence is more liable to damage than is the case when immersed in a soap bath. This soap treatment is reasonably quick and any lack of softness in the fabric may be corrected by using suitable softening agents in the finishing liquors.

Month's New Dyes

New Acid Dyestuff

Lissamine Cyanine is suitable for dyeing yarns and piece goods where brilliancy of shade and fairly good fastness to washing is desired. It possesses good level dyeing properties and is suitable for application to woolen piece goods where cheapness is of greater consideration than light fastness. It may be used either as a self shade or as a component of mode shades on ladies' dress goods, again subject to the above proviso. Lissamine Cyanine AS is of interest for dyeing natural and tin-weighted silks because of its good affinity for these fibres and for the brilliancy of the shades produced. It is suitable for printing on all animal fibres, giving shades which possess only moderate fastness to washing,

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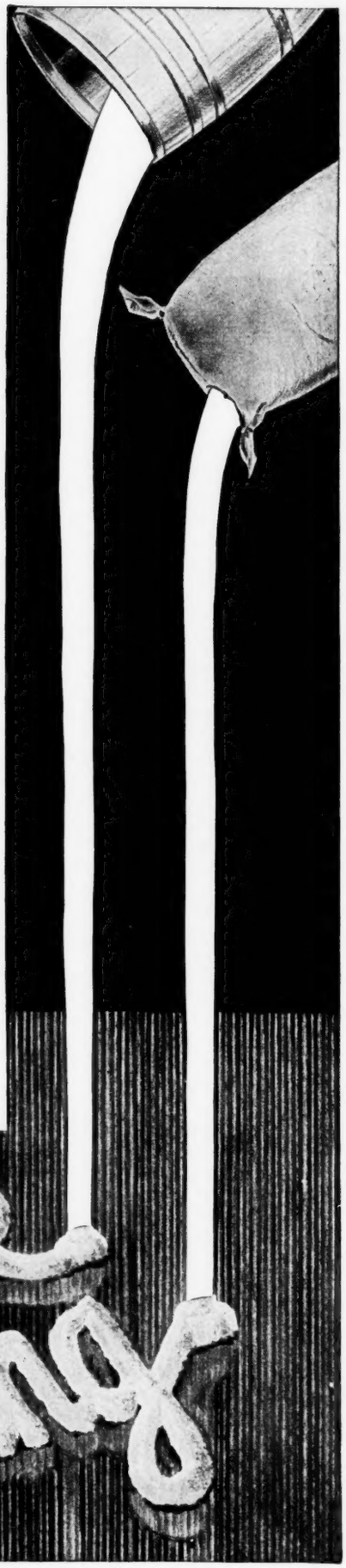

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but of little interest for the dyeing of ground shades on wool and silk for subsequent discharging owing to its tendency to return on exposure to air and light. This dyestuff is also of interest for application to vegetable tanned leathers and for use in brush staining work.

Rapid Fast Orange GH Powder
Rapid Fast Brown IRH Powder
Rapid Fast Olive Brown IGH Powder

Above new additions to the range of Rapid Fast dyes of the I. G. Farbenindustrie, offered in this country by General Dyestuff, are printed in the manner usual with this series of dyes and are suitable for machine, block, stencil and spray printing on cotton, linen, rayon and mixed fabrics of these fibers, as well as for yarn printing and for colored resists under aniline black. Rapid Fast Orange GH Powder is the yellowest orange of the Rapid Fast dyes and the prints possess good fastness to light, very good fastness to washing and very good to excellent fastness to chlorine. Rapid Fast Brown IRH Powder gives a fine reddish brown shade possessing good fastness to light and very good to excellent fastness to washing and chlorine. Rapid Fast Olive Brown IGH Powder produces much yellower olive brown shades than Rapid Fast Brown GGH Powder and possesses very good fastness to light, washing and chlorine. A sample card, showing results produced by printing these colors upon cotton material and rayon-cotton material, is issued by the manufacturer.

Polyphenyl Black SG
Polyphenyl Black SB
Polyphenyl Dark Blue SR

Geigy offers new dyes adapted for cotton, artificial silk (except acetate silk), real silk, half-silk, unions and mixed fabrics of cotton and artificial silk. All are distinguished by good fastness to acid and alkali. Polyphenyl Black SG produces greenish, full black shades of good fastness to acid, alkali, calendering and perspiration, with fairly good fastness to light. It produces deep black shades upon both weighted and unweighted silk. It is also suitable for dyeing unions and half-silk, producing solid shades which do not bronze and which are not impaired by the boiling process. It discharges well and the shade turns purer and more bluish on steaming. Polyphenyl Black SB has properties of Polyphenyl Black SG, except that it produces more bluish shades. Polyphenyl Dark Blue SR is similar to the above members of this group but produces a reddish, deep navy blue shade. The manufacturers have sample card showing dyeings on cotton-viscose, unions, and weighted silk.

National Milling Red R

Attention is drawn to National Aniline's addition to its line of neutral dyeing acid colors which produces bluer shades of scarlet than National Milling Scarlet G. Conc., and is noticeable because of its excellent fastness to milling, washing, sea water, perspiration and rubbing and good fastness to light, cross dyeing and alkali. It is particularly suited for the dyeing of loose wool, slubbing and yarn, and is especially recommended for sweaters, bathing suits and flannels. It is also well suited for the dyeing of pure and weighted silk. The manufacturers have issued a sample card.

Indigosol Green IBA Paste

Carbic Color & Chemical Co., offers Indigosol, manufactured by Durand & Huguenin S. A., which produces brilliant green shades when dyed or padded on cotton or rayon by the usual nitrite-sulfuric acid process. The shades possess excellent fastness. Mixed cotton and viscose are dyed the same shade and this new dye is also recommended for fast shades on pure silk but only for wash goods. It is also suitable for direct printing on vegetable and artificial fibers and while it cannot be resisted, except for the production of fast colored resists under dyeings with various variamine blue salts, it can also be used for dyeing wool. The manufacturers have issued a sample card.

High Boiling Tar Acids as Wetting Agents

Of the four main classes of wetting agents employed in wetting out processes—namely, alkylnaphthalenesulfonic acids, sulfonated oils, sulfonated alcohols, and phenolic preparations, the last-named group has received most extensive application in mercerization. The phenols employed in the preparation of rapid wetting adjuvants are generally carbolic and cresylic acids.

Experience has shown that carbolic and cresylic acid fractions have little or no value in this process, but various trade preparations incorporating these phenols with other components, such as hydrogenated aromatic substances, have proved to be efficacious, and have been extensively imported for use in the cotton industry. In these proprietary articles it is probable that the sole function of the phenols is to form phenolates which, in presence of excess of alkali, dissolve the added hydro-aromatic substances or their equivalent, thus rendering the resulting solution a wetting medium, although neither phenols nor added compounds when used separately have any beneficial wetting effect.

Certain fractions of tar acids from vertical retort and low temperature tars are, under comparable conditions, superior to any other known wetting agent, and the optimum preparation has been named "Shirlacrol."

In search of an efficacious wetting agent, crude tar acids from vertical retort and low-temperature tars formed the starting material. This product required purification, first from neutral and basic impurities which, being insoluble in alkali, produce turbidity or even a separate layer in the phenolate solution, and secondly from small amounts of constituents which, by producing deep red solutions in alkaline media, tend to stain vegetable fibres. These two impurities were removed effectively by the combined action of air and steam introduced into a boiling solution of the crude tar acids in caustic soda, when the color-producing impurities were oxidized and the neutral and basic oils distilled away in steam. In industrial practice this purification might be more economically applied directly to the alkaline extracts normally obtained by tar distillers in the isolation of tar acids.

Distillation of the purified phenols recovered from the foregoing operation yielded a series of fractions, the most volatile of which, boiling below 205° C., was only of small value as a wetting agent, although slightly better than the corresponding fraction from horizontal retort tar. With decrease in volatility, successive phenolic fractions exhibited increase in wetting potency accompanied, however, by diminishing solubility in concentrated alkali. It was ultimately found that the fraction distilling between 205° and 290° C., under atmospheric pressure, dissolved in 26 per cent. caustic soda solution (58° Tw.) to give a clear, colorless solution which, by systematic quantitative tests, was proved to be superior to equivalent solutions of commercial wetting agents.

If the concentration of alkali is reduced to 7-normal (50° Tw.), a narrower fraction of tar acids boiling between 240° and 260°C., can be utilized. This closer-cut product is twice as efficient as the wider fraction (b. p. 205° to 290°), but on account of its comparatively lower solubility, it is not applicable in caustic soda solutions of concentrations greater than 7-normal. The greater solubility of the wider fraction is due to the inclusion of a larger proportion of more volatile constituents, which, although possessing lower wetting potency, are valuable in the form of phenolates, as solvents for the more powerful but less soluble phenolates of higher phenols.

The wetting power, which in mercerizing lyes is greater than that of any known preparation, is a characteristic inherent in the fractions themselves, which therefore require no added component to develop this useful property. Furthermore, they do not require the addition of stabilizing components, since with caustic alkali they produce solutions which do not deteriorate in wetting efficacy. This product which is practically inodorous, is

less corrosive and less toxic than preparations containing carbolic or cresylic acids, and when dissolved in alkalis of appropriate concentration it yields a clear, stable, and almost colorless solution.—*Abstracted from the Chemical Trade Journal.*

Recovering Caustic Solutions by Dialysis

Rayon factories are adapting the use of cerini dialysers to recover caustic soda solutions containing hemicelluloses that have been dissolved from cellulose used as a raw material. A diaphragm unit consists of fifty cells set vertically in a tank, each cell measuring about 9 by 3 by 3 feet. The caustic to be purified runs in at the bottom of the tank outside the cells; ascends with gradual loss of concentration; and flows out at the top. Water enters the cells at the top and flows downward, becoming a gradually more concentrated solution of caustic as it progresses in the opposite direction of flow to the impure caustic (countercurrent).

Since the hemicellulose impurity hardly diffuses through the cell membranes the final result is a caustic solution whose strength depends upon the predetermined rates of flow. The diaphragm consists of tightly woven cotton cloth impregnated with 15 per cent. by weight of magnesium chloride, the cloth weighing about one ounce per square foot. When conditions are such that the apparatus can operate efficiently the equipment is stated to pay for itself in nine or ten months as compared with the cost where there is no recovery.

Acacia Provides New Flavor Color

Extracting the color with cold acetone yields 1.5 to 1.7 per cent. of dye on the weight of the wood, and the crude dyestuff appears to be a sugar or tannin compound of the actual color. The latter gave a pentamethyl ether of 148° C. melting point and a pentaacetyl compound, melting point 224° C. The coloring matter was found to be 3:3′:4′:5′-tetraoxyflavonol. An apparatus is described for obtaining the dyestuff in continuous process. Wood chips are used, 2.5 kilograms being extracted with six liters of acetone. A brownish acetone extract is obtained and evaporated down to the point where the crude dyestuff separates out as a brownish powder on cooling. Various properties and color reactions of the dyestuff with different chemicals are described. It dyes cotton mordanted with alumina in yellowish-orange shades, and in olive green shades when mordanted with iron oxide. The dyeings are quite fast.

Cadmium Electrolytic Extraction

Separation of cadmium from material such as ores, furnace products, or flue or bag-house dusts containing also other metals or compounds, which comprise sulfatizing it with sulfuric acid, or spent electrolyte obtained subsequently in the process, heating—e. g., from 600-800°C.—to drive off excess acid and volatile arsenic, and to render zinc insoluble, and leaching the preferably ground material with water to obtain cadmium sulfate, is further characterized by adding cadmium sulfide to precipitate impurities from the solution, which is then electrolyzed for the production of metallic cadmium. The residue from the leaching contains lead sulfate and the insoluble zinc. The impurities removed from the solution may be lead, copper, bismuth, mercury, and part of the arsenic. Prior to electrolysis, the liquor is brought to a sp. gr. of 1.30, and iron removed by heating the solution oxidized with sodium chlorate and neutralized with lime. The remaining arsenic is carried down with the iron. Thallium if present is removed by adding sodium chromate, and excess of the latter by lead sulfate or by reduction to chromic sulfate with sodium sulfide and precipitation with caustic soda. The purified solution containing, say, 100 grams cadmium per litre is electrolyzed, employing a ferro-silicon anode, and a cathode comprising cadmium sheets previously deposited on and removed from an aluminum cathode.

Tanning Dehaired Skins

A process embracing modification in the tanning of dehaired skins consists of surface deliming of the hides followed by a pretannage in mixed aldehyde and sulfite cellulose extract bath, the hides then being subjected to regular methods of tanning in vegetable or chrome tanning liquors. A decrease in time required for tannage with less loss of hide substance resulting in leathers of better quality and higher yield, are said to be its outstanding advantages.

Speeding Up Vegetable Tanning Process

Patent has been granted for a process for quicker vegetable tanning of cow, ox and buffalo hides which consists in liming and preparing hides in the ordinary way, then subjecting them to the action of a pickling solution until completely delimed and pickled through, subjecting the pickled hides to the action of a depickling solution comprising an aqueous solution of sodium thiosulfate until they are depickled only to such an extent that the hides are brought to a degree of acidity represented by a hydrogen-ion concentration of between about pH 3.5 and pH 5.0, and only thereafter subjecting the hides to treatment with a vegetable tanning liquor of the requisite strength so as to effect their rapid tanning.

New Tanning Liquor

The liquor, as prepared, consists of two or more of the following materials: a fish oil, a sulfonated fish oil, an oxidizing agent, an oxygen carrier, formaldehyde, and mineral oil. Increased penetration and shortening of time for tannage is obtained by the use of an oxidizing agent together with an oxygen carrier.

Oxidizing agents suitable for including with the tannage are sodium, potassium, and ammonium salts of bichromates, perborates and nitrates. The important oxygen carriers are turpentine or kerosene. U. S. Patent 1,908,116.

Latex as Plywood Adhesive

According to the information received by the Technical Department of the International Association for Rubber in the Netherlands Indies, the joints obtained with latex resist moisture better than those obtained with the usual adhesives. Experiments confirm this opinion only with certain reservations. The experimental data obtained, which will be published shortly, showed that plywood made with latex without vulcanization did not comply with the specifications of the Main Committee for Standardization in the Netherlands. When the latex was vulcanized during the adhesion process, better results were obtained. Although in dry condition the plywood did not comply with the specifications, the joint resisted moisture to such an increased extent that the plywood complied with the specifications of the moisture test. This greater resistance to moisture could be expected, as it is a well-known fact that vulcanized rubber absorbs moisture to a less extent than the raw material.

Pigment for Reinforcing Rubber

A new reinforcing calcium carbonate pigment for rubber called Calcene has recently been put on the market. It is a precipitated product of extremely fine particle size, 98 per cent. under 0.4 microns. The surface of the particles is coated with approximately 2 per cent. of a rubber soluble organic material. This coating agent prevents cementation of the individual particles and gives complete dispersion of the pigment. It gives tensile, tear, and abrasion resistance values considerably higher than other reinforcing rubber pigments, except the gas blacks. At approximate loadings, tensile and tear resistance values, hitherto obtainable only with soft gas black, can be reached with this product. The use of Calcene is indicated in rubber stocks requiring high tensile and high resistance to tear and abrasion, especially where a black stock is not desired, or where a relatively soft modulus is desired along with the high physical properties.

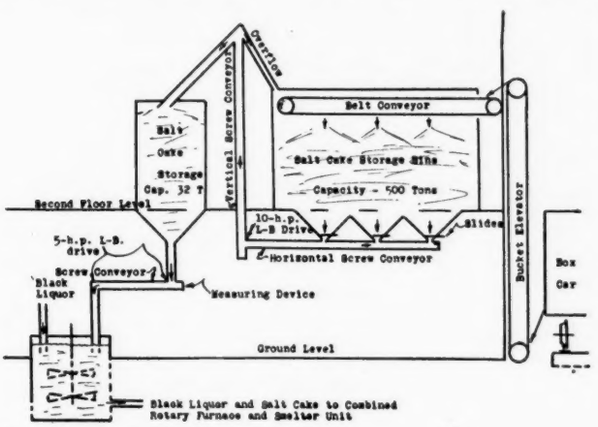
Handling Granulated Salt Cake

An interesting system of conveyors for handling granulated salt cake from box car to smelter was recently installed in the recovery plant of a northwestern state paper company, according to E. P. Gleason.

In utilizing this new system, carloads of salt cake are spotted on a side track near the hopper of a bucket elevator. The granulated salt cake is shoveled and trucked from the car, dumped into the hopper of the bucket elevator and raised to a horizontal belt conveyor above the storage bin on the second floor. This bin has a capacity of 500 tons.

Three chutes at the bottom of the bin deliver the salt cake to a horizontal screw conveyor. A slide in each chute enables the operator to fill the screw conveyor from any of three sections of the storage bin. About ten minutes is required to open a slide, remove sufficient salt cake, and close it again.

The horizontal screw conveyor delivers the material tangentially to a Link-Belt Rotor Lift or vertical screw conveyor, having a lift of thirty feet. The Rotor Lift empties into a storage tank of thirty-two tons capacity, which is filled in three and one-half



Layout of system for handling granulated salt cake

to four hours, and has an overflow back to the five hundred tons capacity storage bin. No attention is required to fill the storage tank other than to start the conveyor system and shut it off when the tank is filled.

From the storage tank the salt cake is fed and measured automatically to a tank sunk in the floor and therein mixed with black liquor. The measuring device and mixing tank agitator are driven by a 5-hp. motor through two roller chains. The automatic measuring device can be set to deliver from 280 to 2,350 lbs. of salt cake per hour. Normal operation requires about fourteen tons of salt cake per 24-hour day.

From the mixing tank, the salt cake suspended in the black liquor is pumped directly to a new combined rotary furnace and smelter unit equipped with waste heat boiler. The older units are not equipped to smelt the mixture of black liquor and salt cake. The salt cake must be moved in a wheelbarrow and shoveled into the smelter by hand.

That part of the handling system—from horizontal screw conveyor to pump for handling the mixture of black liquor and salt cake—has two distinct advantages over the old method.

(a) Dust from the light granulated salt cake is eliminated and the department is more comfortable for the workmen.

(b) Working three shifts, the conveyor system effects an annual saving of $2,180 over the former method of handling the salt cake.

A bucket elevator on 30-ft. centers, 15-ton capacity per hour at 100 feet per minute, was originally considered for handling the salt cake from storage bin to the tank over the measuring device, but was rejected in favor of the screw conveyor system for the following reasons:

1. Granulated salt cake is very dusty, and the casing of either type of conveyor must be absolutely air-tight. It is easy to make tight joints on the screw conveyor, and the vertical screw conveyor or Rotor Lift was furnished with a one-piece spirally welded steel casing.

2. The first cost of the vertical screw conveyor system was found to be less than for a bucket elevator.

3. The greater simplicity of the screw conveyor should mean lower maintenance.

4. The screw conveyor is quieter in operation, and its erection cost smaller.

5. Less space is required for the screw conveyor.—*Paper Industry*, Sept. 33, p. 319.

Mahogany Sulfonates in Dry Cleaning

It is now possible to incorporate with dry cleaning solvent definitely controlled amounts of water, sufficient to bring about the removal of water spots and water-soluble stains, but insufficient to cause color bleeding, shrinkage or other troubles. This is done by means of mahogany sulfonates (in definite percentages), which absorb appreciable quantities of water without losing their solubility. By using these dispersing agents it is possible to produce clear dispersions of water in the solvent, ranging from a few tenths per cent. to as much as 20 per cent. water content. The power of these compounds to absorb water is increased by the addition of small amounts of alcohols or cresols.

Mahogany sulfonates are colloidally soluble in water, soluble in all proportions in oil, and either alone or mixed with oil have the capacity to absorb approximately their own weight of water and still retain their oil solubility. Stains caused by water or syrups can be completely removed by agitating the fabric with solvent containing from one to two per cent. of a mixture made up of 50 per cent. mahogany sulfonate and 50 per cent. water. The concentration of water necessary depends on the nature of the goods under treatment, the ratio between weight of goods and weight of solvent and the nature and extent of the stains.

It is desirable first to remove the greater portion of oily and greasy stains before the treatment with the solvent containing water. These sulfonates also possess the added advantage of lowering the interfacial tension between gasoline and water to a much greater degree than fatty acid soap mixtures, permitting rapid and complete wetting out and absorption of the cleaning solvent by the material under treatment, which always contains moisture. They also decrease the surface tension of the solvent and prevent the formation of static charges.

Mahogany sulfonates are produced commercially as by-products of the operation of refining petroleum to produce medicinal white oils or light-colored technical oils, by treating the petroleum or fractions of it with fuming sulfuric acid and/or sulfur trioxide.

Synthetic Cotton

The reported discovery of a process for the manufacture of artificial cotton has been announced by the Kurashiki Kenshoku (Silk Weaving) Company. The material is produced from wood pulp and woven into yarn, said to be of a very high quality, less glossy than rayon but of greater strength, thus standing midway between the two. The process is said to be cheaper and far simpler than for making rayon, and that most of the plant used in rayon manufacture can easily be applied to the production of artificial cotton.

New Superphosphate

Bureau of Chemistry & Soils' chemists told A. C. S. Fertilizer Section at Chicago of new calcination process for preparing rock phosphate for the farmer. Object is to drive off fluorine, which is combined with phosphates in all natural phosphate, since phosphates cannot be readily utilized by plants as long as they are locked up in fluorine compounds. Although there have been previous efforts to do this, recent experiments are the first to produce results.

Incidentally, process offers promising method for recovering fluorine. Another feature is yield of a cheap phosphate free of undesirable impurities which can be used in mineral mixtures for livestock. Fluorine present in superphosphate has prevented use for livestock.

Solid Hydrogen Peroxide

The double compound of urea and a substance of the type of glucose ureide has been found to take up a much higher proportion of hydrogen peroxide than glucose ureide alone. Mixing 22 parts of glucose ureide with three parts of 30 per cent. hydrogen peroxide and drying the pasty mass at the lowest possible temperature, a product is obtained with a hydrogen peroxide content of 1.5 to two per cent. On the other hand, a solid preparation formed on heating 22 parts of glucose ureide with six parts of urea and 10 parts 30 per cent. hydrogen peroxide contains nine per cent. of hydrogen peroxide. Further stability can be imparted by incorporating an acid or an acid salt.

New Dyeing Machine

A package yarn and dyeing machine has been developed of stainless metals, including all aluminum, all monel metal or with standard steel kier and iron piping and pump. A raw stock dyeing machine of stainless metal construction is also a new output of the company. It is claimed for these machines that they eliminate saddened colors, stains and off colors, and that they greatly reduce cleaning time.

Powdered Aluminum in Floating Soaps

Good results have been obtained with aluminum powder in the manufacture of floating soaps using as fat charge palm kernel oil and rather low-grade bone fat, yielding a homogeneous and good-colored soap. The addition of the aluminum powder greatly improves the color of the soap, partly due to the bleaching effect of the hydrogen liberated when the powdered metal combines with the free alkali in the soap. From 20 to 30 grams of the metal powder are used per 100 kilogs of soap. The use of this powder has a retarding effect on rancidity, but in every case the powder must be perfectly pure and free from other metals. Compared with air-blown soap, in which the air bubbles are visible, the hydrogen is so finely distributed that it is quite invisible. These soaps generally keep much better in storage than more compact and heavier soaps.

New Sulfite-Pulp Process

A new company has been formed to exploit a method of producing sulfite pulp. Instead of bisulfite of lime, bisulfate of soda is used for the cooking liquor, which is indirectly heated by one of the known heating systems with liquor circulation. The circulating quantity of alkaline salts being small, the losses of alkali are remarkably slight, while the sulfur consumption is also much reduced.

New Use for Titanium Oxide

Ordinary fibre board cut into the shape of pie-pans and impregnated with titanium oxide has recently been put on the market by the Purity Fibre Co., and is finding a ready sale to bakers of pies who can put their wares through their ovens in these fibre pans which, it is claimed, help produce as dry and flaky a crust on the bottom as on the top of the pie.

Increasing Heat-Resistance Synthetic Yarns

Yarns and fabrics comprising organic derivatives of cellulose—e. g., esters of organic acids such as cellulose acetate or cellulose ethers—are improved by treatment with a mixture containing a halide of a volatile base—for example, ammonium bromide—and a borate or phosphate of a volatile base—e. g., ammonium borate or phosphate,—to which boric acid may be added, followed or preceded by a weighting treatment. The materials are weighted with an insoluble metal compound such as tin phosphate or silicate by known methods. Materials comprising a cellulose ester may also be partially or superficially saponified—for example, by sodium triphosphate. E. P. 391,105.

Company Booklets

C40. Anderson-Pritchard Oil Corp., (Research Laboratories) 3921 E. Ravenswood ave., Chicago, Bul. 12.—"Apcothinner in Alkyd Varnishes, a Quick Thinner for a Quick Drying Varnish." This bulletin describes in detail a research on the subject carried on during more than a year. Twelve charts, in which results of specific problems handled are plotted in "curves," visualize results. This bulletin is at present being distributed in advance to users of Apcothinner, but copies will be available later also to others who may be interested.

C41. Godfrey L. Cabot, Inc., Boston. A 22 page booklet telling about the development of Spheron, dustless carbon black produced by Godfrey L. Cabot. Booklet goes briefly into the history of the manufacture and use in rubber industry of carbon black, development of compressed black around 1919 and experimental work on a dustless black started in 1924, resulting in commercial production in 1932.

C42. E. I. du Pont de Nemours & Co., Wilmington. July-August issue of The Du Pont Magazine is noteworthy for a splendid article "The Story of Sulphur" which deals largely with the early history of the sulfur industry in the U. S., and "Beauty and Utility in Cadmium Plating" by M. S. Dennis, Grasselli's well-known advertising manager.

C43. Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City. An 8 page circular describes use of Para-Dors in deodorizing rubber goods.

C44. Hercules Powder Co., Wilmington, "Industrial Progress Through Mining" a history of explosives in industry featured the July-August issue of The Hercules Mixer.

C45. La Motte Chemical Products Co., McCormick Bldg., Baltimore. Latest service bulletin describes various La Motte soil testing sets available.

C46. Mallinckrodt Chemical Wks., St. Louis. September price list shows one decline and 36 advances.

C47. National Aniline & Chemical Co., 40 Rector st., N. Y. City. September issue of Dyestuffs features "Ageing Vat Prints" by H. B. Briggs; gives the new hosiery shades for Fall 1933; "Factors in Rayon Manufacture Which Affect Dye Affinity" by W. B. Sellars, and several other extremely interesting articles for the textile field.

C48. Philadelphia Quartz Co., 121 South Third st., Phila. This company has performed a service to chemical industry by preparing booklet giving first published formulas on the use of sodium metasilicate for electro cleaning of various metals.

C49. Philadelphia Quartz Co., August P's & Q's is devoted to a summary of the uses of metasilicate.

C50. Rossville Commercial Alcohol Corp., 230 Park ave., N. Y. City. July Rossville Talks is devoted to the use of alcohol in the brake-lining industry; August to alcohol in the petroleum field.

C51. Hercules Powder Co., Wilmington. Form 522 reports in detail on the relative effect of nitrocellulose, gums and plasticizers on discoloration.

C52. Thickol Corp., Yardville, N. J. Booklet of 12 pages describes uses and properties of "Thickol"—solvent-resisting, rubber-like olefin polysulfide compound.

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French Use Cast Iron to Resist Corrosion

By A. Matagrin

At the beginning of the present century cast iron held undisputed leadership among the metals used in French chemical plants. Roasting furnaces, in the old chamber plants as well as in the modern contact plants, were made from cast iron and steel; ordinary cast iron offers greater resistance to sulfur dioxide in moderate concentrations than the special types high in phosphorus, manganese, or silicon. In the old Leblanc soda works where nothing but cast iron was used, corrosion was always a serious problem. Modern electrolytic plants are far better equipped, although cast iron is still widely used, frequently with rubber lining. Where contamination with iron must be avoided, such as in the production of acetic acid and in organic synthesis, special cast irons, enameled steel, nickel, aluminum, aluminum bronzes, and occasionally special steels are used. Alkalies are sometimes handled successfully in cast iron, which undoubtedly takes on a protective film. But the chlorides, especially magnesium chloride, the sulfates, and the nitrates always give difficulties, and in superphosphate plants cast iron equipment such as agitators and fans does not last more than 4 to 5 years.

In organic chemical plants where cast iron has numerous uses, mainly in the larger installations, many corrosion problems are encountered, often in combination with high temperatures. Sulfur is a frequent source of difficulty in petroleum refineries; recent installations in this field are utilizing galvanized iron, rustless steel, and sometimes aluminum. Copper is commonly used in wood distillation.

Use of iron of high purity has also been considered, although it is often a difficult question to determine which material has the greatest resistance, the pure metal or the alloy.

In pipe lines for corrosive gases and for high-pressure work, for which strength of copper is insufficient, wrought iron offers better resistance than common steel without a protective coating. But in underground pipe lines, without special protection against soil corrosion or stray currents, and for alkaline solutions, steel or above all cast iron are far superior to wrought iron. This may be attributed to protective films produced during the casting or rolling processes; machining whereby such films are removed would result in the loss of this advantage.

Electrolytic iron frequently offers many advantages inherent in its method of manufacture. This iron has an appearance resembling the best Swedish iron, and has many of its qualities. The price is reasonable, especially for the seamless tubes which are used to great advantages in many plants where corrosion is high. It has found wide application in the salt industry on account of its high resistance to sodium chloride solution, at least in the absence of air.

Certain constituents found in small quantities in ordinary cast iron may, if used in larger proportions, increase its chemical resistance. This does not, however, refer to phosphorus, which preferably should be kept as low as 0.04 or 0.03%. Manganese, easily oxidized by moist air when in pure state, does not seem to have any detrimental effect upon the chemical resistance of white cast iron low in silicon (about 1%). In foundry irons which generally contain 0.5 to 0.6% manganese this constituent makes easier casting by increasing the fluidity of the metal, giving castings free from blow holes and with improved chemical and mechanical properties.

Behavior of manganese should be closely studied. Alloys with too high manganese content are attacked by acids and discolor alkaline solutions.

Silicon seems to be the important addition agent, with manganese playing only a secondary part. First cast irons made with increased chemical resistance in view were also silicon irons. Although it is not necessary to go beyond 1.5% silicon in ordinary cast iron, cast irons containing about 4% silicon show noticeable improvement in resistance to atmospheric corrosion and to attack by acids; at lower silicon contents the manganese content should be increased by addition of spiegel, or a higher nickel content may be used to increase the chemical resistance. Only beyond 12% does silicon really protect cast iron from all oxidation, the cast iron then approaches real ferro-silicon. Although the material added is not in itself so expensive, the process of melting becomes so difficult that a material increase in the cost of the metal results.

In spite of their shortcomings the silicon cast irons were the first cast irons with high chemical resistance which were fabricated and studied in France. First patents were issued in 1903. In that year announcements were also made of the use of silicon cast iron in a plant in Lyons, for pipes used in the direct condensation of nitric acid; this alloy was also used in sulfuric acid plants, for concentrating pans.

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The factors which have tended to limit the success of the silicon cast irons in France are their mechanical shortcomings, limiting their use to apparatus of simple construction, and precluding great and rapid temperature changes.

A comparison of the chemical resistance of various types of cast iron is given. With low silicon content chromium, or chromium and nickel must be added to obtain good corrosion resistance. Nickel always increases resistance to alkalies, and chromium resistance to nitric and hot gas. But more attention is given to the special nickel cast irons which are interesting on account of their high resistance to alkalies and high temperatures. When the price does not present an obstacle, addition of chromium, molybdenum, or tungsten to silicon cast irons improves chemical resistance.

Comparative Chemical Resistance of Various Special Cast Irons (From Brousscool Furnaces, Haute-Marne)

—Percentage of Alloying Elements—							Corrosion Resistance—				
C	Si	P	Mn	S	Ni	Cr	Sulphuric Acid	Nitrous Vitriol	Alkalis	Hot Gas	Atmospheric Action
3.95	1.30	0.15	0.85	0.07	2.00	....	2	1	3	2	2
3.90	1.60	0.20	0.85	0.07	....	0.95	3	3	2	4	3
3.90	1.60	0.15	0.75	0.08	....	....	1	2	2	2	2
3.40	1.65	0.62	0.52	0.08	....	0.85	2	2	2	3	2
3.20	1.85	0.45	0.43	0.09	....	....	3	2	1	1	2
3.40	1.80	0.82	0.51	0.07	1.50	0.55	2	2	3	3	3

Values given for resistance: 1: Poor; 2: Fair under certain conditions (concentration, temperature, etc.); 3: Quite good under certain conditions; 4: Satisfactory under all conditions. The data are based on laboratory tests, with exception of those obtained for atmospheric conditions.

The success of the new nickel cast irons was clearly demonstrated at the last World Foundry Congress and International Foundry Exposition, held in Paris in Sept. 1932. Fear that the price would be too high caused much hesitance in France about introducing nickel in cast iron. But researches such as those conducted by J. S. Vanick and P. D. Merica, and finally the work by the French metallurgists Leon Guillet, M. Ballay, J. Galibourg, and others have finally awakened the interest in this material, and in the importance of secondary additions such as copper and chromium, and the influence of the perlitic or austenitic state of the alloy upon the chemical resistance. A. Matagrin, France, *Chemical & Metallurgical Engineering*, Sept. p. 480.

Correct Filtration Methods

Suitable operatives are all-important in filtration plant. One foreman should be responsible solely for this section of the factory; one foreman may be enough for all 3 shifts.

Capacity of the filter depends on the solution and its suitability and economy can only be made by observing operation, 5—8 months. In a new plant determine the technical suitability of the filter-cloths, disregarding economic considerations first; the cloth must give a clear filtrate. The time required for filtering a given amount should be observed over a period of normal, uninterrupted working; the cloths deteriorate rapidly by retention of aggressive chemicals when the plant is idle. If production ceases, the cloths should, if possible, be taken out immediately, and in any case thoroughly washed and dried. Best cloth having been discovered, a cheaper may be sought. No general rule as to type of cloth can be laid down. Cotton cloth possesses a pronounced capacity for adsorption, and retains fine organic sludges. Wool and linen do not share this property. Some times for clear filtration, a thin layer of sludge must be formed on the cloth, particularly with slimy, colloidal suspensions.

When starting a filter-press, very low pressure should be used. This should be increased very slowly and steadily, or clear filtration will not be obtained. If the filtrate runs turbid, the blame should not be immediately laid on the cloth.

With large filtering surfaces for fine, greasy sludges, a washing machine for the cloths will pay and should be washed thoroughly once a week.

Repairs to filter-cloths can be made on the sewing machine for mending sacks. Cloths should be repaired from the back, so that the movement of the scraper over the front of the cloth is not impeded. It is not advisable to use a damaged filter-cloth as a backing for an undamaged one; this practice necessitates the use of higher pressures and so shortens the life of the cloths. *Chemiker Zeitung*, Aug. 9, 1933, p. 621.

Isopropyl Alcohol Properties, Uses

Isopropyl alcohol is produced mainly in grades, crude for denaturing purposes, 91% and anhydrous; a product suitable for perfumers' use is also manufactured. It is more easily dehydrated than ethyl alcohol; a brief digestion with caustic soda and subsequent distillation give the anhydrous alcohol distilling at 82.4° C. The physical properties of pure anhydrous isopropyl alcohol are:

Melting Point	—85.8 °C.
Boiling Point	82.4 °C. at 760 mm. $dt/dp = 0.033$ °C. per mm.
Vapor Pressure	32.4 mm. of Hg. at 20 °C.
Density	(20 °/4 °C.) 0.7887 (0.7283 at b.p.)
Viscosity	(20 °C.) 0.02431 poise.
Flash Point	11.7 °C. (53 °F.) (Closed cup.)
Refractive Index (nD)	1.37925 at 15 °C. 1.37757 at 20 °C.
Critical Temperature	234.9 °C.
Critical Pressure	53 atmospheres.
Latent Heat of Vaporization (at B.P.)	160 cal./gm.
Heat of Combustion	7970 cal/gm.
Specific Heat (cal./gm./°C.)	0.563 at 0 °C., 0.677 at 30 °C., 0.740 at 50 °C.
Surface Tension (20 °C.)	21.7 dynes/cm.
Dielectric Constant (20 °C.)	26
Vapor Density	2.127 at 100 °C.

The properties of the azeotropic mixture with water are as follows:

Composition	91.1% alcohol by volume, 87.7% by weight.
Boiling Point	80.4 °C. at 760 mm.
Specific Gravity	{20 °/4 °C. 0.8158. {60 °/60 °F. 0.8190 (6.82 lb./gal.)
Refractive Index	1.3765 at 20 °C.
Viscosity	0.02106 at 25 °C.
Flash Point	64 °F. (closed tester).
Coefficient of Expansion	0.001062 per degree C.

Isopropyl alcohol forms a large number of binary azeotropic mixtures, of which the following may be noted:—

Other Component	Wt. % Isopropyl Alcohol	Boiling Point of Mixture, °C.
Carbon Bisulfide	0.8	44.6
Chloroform	4.2	60.8
n-Hexane	22	61
Isopropyl Ether	10	64.9
Carbon Tetrachloride	18	67
Cyclohexane	33	68.6
Cyleohexene	36	71
Benzene	33.3	71.92
Ethylene Dichloride	45	74
Trichlorethylene	28	74
Ethyl Acetate	23	74.8
Methyl Ethyl Ketone	30	77.3
Isopropyl Acetate	52.3	80.1
Toluene	69	80.6
Tetrachlorethylene	80.6	81.7

The alcohol is satisfactory anti-freeze, miscible in all proportions with water, free from offensive odor of completely denatured ethyl. Below 0° F. a mixture of 65% isopropyl alcohol and 35% methyl alcohol, gives the equivalent protection, per unit volume of alcohol, as ethyl alcohol.

The alcohol, easily obtained in the anhydrous condition, is useful for the dehydration of nitro-cellulose, especially for export purposes, where a duty on ethyl alcohol is a consideration. It may also be used for drying and preserving animal and vegetable tissues, for drying sugars, starches, proteins, etc., has superior bactericidal power, as compared to ethyl alcohol. The most effective concentrations are 30 to 50%. Dr. Benjamin T. Brooks, World Petroleum Congress.

Complete Concentrated Fertilizers

Interesting development of the synthetic ammonia industry has been the manufacture of concentrated complete fertilizers containing nitrogen, phosphates, and potash in suitable proportions and all soluble in water. Basis is a mono-ammonium phosphate, made by subjecting finely-ground rock phosphate to mixture of sulfuric and ammonium sulfate. This gives directly a solution of mono-ammonium phosphate containing a little ammonium sulfate, and calcium sulfate is precipitated. The mono-ammonium phosphate contains 12.2% nitrogen and 61.7% phosphoric acid, and is thus a highly concentrated fertilizer. By mixing this with ammonium sulfate and a potash salt, wide range of fertilizers can be obtained. Ingredients are finely ground, passed to a special incorporator, in which they are

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churned by paddles, while saturated steam is blown in. Granules formed, are then dried; roughly, 1 ton of such fertilizers supplies as much plant food as 2 tons of ordinary. They possess advantage of reducing freight and handling charges and cost of distribution to the land; they are granular in texture and very easy to sow, and they can be stored without risk of deterioration. Further, constituents are all soluble in water.

Another point claimed in their favor is that they contain little except the 3 fertilizers, nitrogen, phosphates, and potash, while ordinary fertilizer contain appreciable, and in some cases large, amounts of calcium, sulfur, and other elements. In some soils absence of additional substances might be a disadvantage, and a careful comparison of new fertilizers with the old will be necessary to show that no disadvantage attends use of the new over a number of years. Accurate field experiments on a wide variety of soils were carried out in this country in 1930 to compare relative effects of concentrated complete fertilizers and of mixtures of sulfate of ammonia, superphosphate, and potash giving same amounts of nitrogen, phosphates, and potash. With 3 crops examined (oats, potatoes, and sugar beet), concentrated gave same average increases in yield as the equivalent ordinary mixtures. At certain centres, however, concentrated fertilizers gave better results, and at others a poorer yield than ordinary.

If concentrated fertilizers were used continuously over a number of years, increased attention would require to be given to liming. Dr. Alexander Lauder, president, Agricultural Section of the British Association, Sept. 7.

Phosphoric Acid from Superphosphate

Outlining the most suitable procedure to manufacture pure phosphoric acid and sodium phosphate, Dr. Kufferath strongly advises against raw phosphate as the starting point. Violent frothing of the reaction mixture, which occurs on stirring with sulfuric, is a grave danger and the entire fluorine content goes to waste. Addition of sulfuric must therefore be gradual with prolongation of time. Incidentally, dissolved fluorine salts may destroy porous stone during filtration if these are constructed of quartz. Danger of corrosion can be prevented by using "brandol stone" (a plastic material), or the more recently introduced carbon filter masses which combine high resistance to corrosion with a mechanical strength bearing comparison with that of the best porous stone.

Superphosphate is indisputably best starting point for an economical practicable phosphoric acid process. It is stirred in a pitch pine vat with boiling water containing requisite sulfuric for conversion of the calcium into calcium sulfate. A stirrer of the lattice or propeller type is recommended and those parts most exposed to wear are preferably of lignum vitae. Non-corrosive steel is only suitable for the stirrer when resistant to abrasive action of superphosphates. Heating is effected with dry steam through a thick-walled lead tube passing to the floor of the container. Waste steam escapes through side tubes. After 2 hours digesting contents are led off into wooden vats fitted with fine-pored filter stones, with pore diameter about 0.015 mm. Rapid filtration takes place and filtrate flows into homogeneously leaded pressure vessels whence the crude phosphoric acid (specific gravity 1.12 to 1.15) is either pumped to the stirring plant in which it is treated with alkali salt or to evaporating apparatus and concentrated to a specific gravity of at least 1.2 in homogeneously leaded Frederking boilers. Passed into large shallow lead-lined iron containers, dissolved gypsum and a certain amount of calcium monophosphate settles out. It is important to add an exactly calculated amount of sulfuric during digestion, preferably rather less than the theoretical amount to reduce the sulfate ions in final alkali phosphate.

Conversion of technically pure phosphoric to secondary sodium phosphate is now practiced on an extremely large scale since this salt serves as the raw material for other important sodium phosphates. During neutralization, calcium, iron, aluminium and magnesium are precipitated as phosphates, while addition of sodium sulfate leads to elimination of arsenic. When reaction is completed and carbon dioxide has been driven off, it is advisable to add a small proportion of decolorizing carbon to absorb the organic matter originally present in superphosphate. Hot reaction mixture is passed into a pressure vessel fitted with stirring gear and from there forced through a filter press; it is then washed with a little hot water and the filter cake subjected to preliminary drying in the press for a few minutes with a compressed air blast, when it is more readily detached from the cloth. After drying, the precipitate forms a valuable fertilizer which compares with a 35% phosphorus pentoxide content.

Filtrate, together with earlier batches of washing water, are brought into iron containers and cooled to 12°C. with stirring. Moist crystals of secondary sodium phosphate are centrifuged and air-dried in a rotating drum at ordinary temperature. Water of crystallization can only be cheaply removed with the rotary drier. When sufficiently concentrated, hot solution should be transferred to a hot water-jacketed storage tank above rotary drier. Drum can be safely maintained at 150°C. since decomposition to pyrophosphate only begins at about 240°C. Anhydrous salt removed from the rollers with the scraping knife falls into a heated chamber fitted with a travelling worm and emerges as a white homogeneous fine granular powder. ("*Metallborse*," July 26, 1933, p. 942).

Economical Absolute Alcohol Production

Process for absolute alcohol production has been developed recently by the I. G. Process is said to be particularly suitable for tropical conditions. The dehydrating medium (gypsum) is cheap, and is easily regenerated in the apparatus in which it is used. Only 1 grade of spirit is produced, 99.8%, and the steam consumption and power figures quoted are very favorable.

Dehydration takes place in 2 parallel drums, in which mechanical agitators keep the pulverized gypsum in motion and drive it forward. In the 1st drum the alcohol is dehydrated, and in the 2nd drum the gypsum is regenerated for re-use. Low-grade alcohol vapor, containing water, passes through the 1st drum, coming into contact with the dehydrated gypsum, which is kept in constant movement, the alcohol vapor being converted into absolute alcohol, which, after passing through an automatic dust filter, is condensed, passing afterwards through another filter as an extra precaution.

In the drum which serves to dehydrate, the gypsum passes over a series of heated tubes, giving off its water, which is expelled by means of a current of heated air supplied by a fan. The gypsum drops through a vertical pipe to a screw conveyor, which carries it again to the 1st drum. These pipes at the same time serve to close the apparatus completely.

The vapor of the organic liquid, which serves as a vehicle for heating the unit in the gypsum dehydrating drum, is produced in a special boiler and conveyed through the system at low pressure, being condensed there and returned to the boiler. This boiler is heated with high pressure steam (12 to 15 atmospheres) by direct heat, or by electric current, whichever may be most economical. At the same time, the heated air for driving off the water in the dehydration of the used gypsum is similarly obtained.

As regards the gypsum used in the dehydrating, it is best to dehydrate this at a temperature of 175° C., the losses being insignificant, being made up by additions, periodically, without interrupting the continuous operation of the plant. For driving the plant a line shaft is installed, from which power is transmitted to the alcohol drum, the gypsum drum, the two screw conveyors, and the two fans. The plant works automatically, as the control of the temperatures, the feed and draw off of the alcohol; and the feed of the gypsum can be done by one person.

Cost of the entire absolute alcohol plant, including piping, pumps, shafting, and motors (but not tanks or storage equipment) with a capacity of 12,000 litres (2,640 gals.) of fuel alcohol of

99.8° per 24 hours and working raw alcohol of 94°, is approximately $25,000 f. o. b. steamer at European port, this price including the royalty privileges for the use of the patent. If alcohol of less than 94° is worked, a larger gypsum drum is required, and the increase in price would be about $2,000 to $3,000. Above is given a table showing the power and material necessary to obtain 10,000 litres (2,200 gals.) of 99.8% alcohol when working various grades of raw alcohol. *International Sugar Journal*, September, 1933 Paper read by P. Pusl before 6th annual conference of the association of Sugar Technologist Clubs.

	Raw Spirit of:		
	94	*90*	*80*
	per cent	*per cent*	*per cent*
Fuel as hard coal, in tons	0.26	0.45	1.0
Fuel as crude oil, in tons	0.14	0.23	0.52
Fuel as electricity, k. w. h.	1,160	2,030	4,600
Electric current for running, k.w.h.	240	360	540
Motor of dehydrator, h.p.	15	20	30
Cooling water at 30°C., gals.	19,136	19,136	19,136
Hot air at 180°C., cub. ft.	883	1,518	3,460
Gypsum used per hour, lbs.	1,056	1,848	4,180
Gypsum lost, lbs.	55	99	209
Alcohol lots in process, per cent.	0.5	1.0	2.0

Diphenyl Heating In Refining

Up to the present, heating in petroleum distilling units has been done more or less exclusively either by direct firing or by steam heating. Indirect heating mediums other than steam are becoming more and more popular due to the desire to use high transmission temperatures without the use of a heating medium at high pressure, and also to maintain closer control over the heat transmission process. The Indian Refining Co. have developed the Govers system using diphenyl vapors. The diphenyl is heated in a special furnace, and heat is transmitted to the oil by circulation of the diphenyl. It has been shown that there is practically no decomposition of the diphenyl, but the high temperatures involved in this process combined with the characteristics of the heating medium necessitate the use of special high resistant pipe material. Another feature of this process is that the risk of local over-heating of the oil is practically eliminated, thus permitting operation at a high mean temperature level. Mercury vapors have been used instead of diphenyl by the Sun Oil Co., the heating of the mercury being carried out in equipment similar to that used in the case of diphenyl. It is claimed that the results obtained are superior to those secured with the conventional heaters. Dr. R. K. Fischer, *Reports on the Progress of Naphthology*, 1932. Reprinted from the *Journal of the Institution of Petroleum Technologists* 250 p. Price 10s. 6d.

Rayon Production

Total installed U. S. capacity rayon producers as of July 1, 1933 amounted to 233,400,000 lbs. of yarn annually. This will be increased to 260,000,000 lbs. as a result of additions now in installation. Operating capacity is estimated at 10 to 15% less than the installed capacity, indicating current production at the rate of approximately 210,000,000 lbs. annually.

Capacity of viscose yarn far exceeds all other types, being 180,700,000 lbs. compared with 35,500,000 lbs. acetate, 8,900,000 lbs. cuprammonium, and 8,300,000 lbs. nitrocellulose.

Geographically the industry concentrates along the Allegheny mountains from Pennyslvania south. The principal factors in determining location are accessibility to consuming textile mills, and water supply.

Figures showing the installed capacity of the 18 producing companies by plant and process, as well as the capacity by districts and states, are shown below.

(Units are millions lbs. per year)

	Total Co.	*Plant*	*Viscose*	*Acetate*	*Others*	*Cap. after reported additions are made (see footnote)*
The Viscose Co.	77.0					87.0
Lewiston, Pa.		22.0	22.0			
Marcus Hook, Pa.		15.0	15.0			
Meadville, Pa.		3.0		3.0		
Parkersburg, W. Va.		15.0	15.0			
Roanoke, Va.		22.0	22.0			
DuPont Rayon Co.	37.2					37.2
Buffalo, N. Y.		6.4	6.4			
Old Hickory, Tenn.		21.3	21.3			
Richmond, Va.		6.5	6.5			
Waynesboro, Va.		3.0		3.0		
Celanese Corp. America	*22.0					22.0
Amcelle, Md.		22.0		22.0		
American Glanzstoff Corp.	17.3					20.5
Elizabethton, Tenn.		17.3	17.3			
Industrial Rayon Corp.	16.7					16.7
Cleveland, Ohio		7.0	7.0			
Covington, Va.		9.7	9.7			
Tubize Chatillon Corp.	16.3					25.3
Hopewell, Va.		8.3			8.3**	
Rome, Ga.		8.0	6.0	2.0		
American Enka Corp.	15.0					17.0
Asheville, N. C.		15.0	15.0			
American Bemberg Corp.	7.9					10.0
Elizabethton, Tenn.		7.9			7.9**	
Tennessee Eastman Corp.	5.5					5.5
Kingsport, Tenn.		5.5		5.5		
Skenandoa Rayon Corp.	3.5					3.8
Utica, N. Y.		3.5	3.5			
New Bedford Rayon Co.	3.0					3.0
New Bedford, Mass.		3.0	3.0			
The Belamose Corp.	2.8					2.8
Rocky Hill, Conn.		2.8	2.8			
Woonsocket Rayon Co.	2.2					2.2
Pawtucket, R. I.		2.2	2.2			
Delaware Rayon Co.	2.0					2.0
New Castle, Del.		2.0	2.0			
Hampton Company	1.5					1.5
Easthampton, Mass.		1.5	1.5			
Amoskeag Mfg. Co.	1.3					1.3
Manchester, N. H.		1.3	1.3			
Acme Rayon Corp.	1.2					1.2
Cleveland, Ohio		1.2	1.2			
The Furness Corp.	1.0					1.0
Gloucester City, N. J.		1.0			1.0**	
Total Installed Capacity		233.4	180.7	35.5	17.2	260.0
Operating Capacity (at 90%)		210.0	162.7	32.0	15.5	234.0

*Estimated.

**Tubize at Hopewell is nitrocellulose process; Bemberg at Elizabethton and Furness at Gloucester City are cuprammonium process.

Additional Capacity Being Installed

(a) At Meadville, 2 million lbs. acetate to total 5 million lbs.; at Parkersburg, 8 million lbs. viscose to total 23 million lbs. (b) At Elizabethton, 2.7 million lbs. viscose to total 20 million lbs. (c) At Rome, 3 million lbs. viscose by December and 6 million lbs. viscose additional next year, to total 9 and 15 million lbs. viscose by December and in early 1934, respectively. (d) At Asheville, 2 million lbs. viscose to total 17 million lbs. by Fall. (e) At Elizabethton, 2.1 million lbs. of cuprammonium to total 10 million lbs. (f) At Utica, 0.3 million lbs. of viscose to total 3.8 million lbs. is under consideration. Bemberg and Glanzstoff (b and e) to start installing in September; apply 85% for operating capacity.

Capacity and Process by States

(Units are millions lbs. per year)

	Total		*Viscose*		*Acetate*		*Others*	
	Dist.	*State*	*Dist.*	*State*	*Dist.*	*State*	*Dist.*	*State*
New England	10.8		10.8					
Connecticut		2.8		2.8				
Massachusetts		4.5		4.5				
New Hampshire		1.3		1.3				
Rhode Island		2.2		2.2				
Middle Atlantic	50.9		46.9		3.0		1.0	
New Jersey		1.0						1.0
New York		9.9		9.9				
Pennsylvania		40.0		37.0		3.0		
South Atlantic	163.5		114.8		32.5		16.2	
Delaware		2.0		2.0				
Georgia		8.0		6.0		2.0		
Maryland		22.0				22.0		
N. Carolina		15.0		15.0				
Tennessee		52.0		38.6		5.5		7.9
Virginia		49.5		38.2		3.0		8.3
W. Virginia		15.0		15.0				
Middle West	8.2		8.2					
Ohio		8.2		8.2				
Total	233.4	233.4	180.7	180.7	35.5	35.5	17.2	17.2

—*Textile Organon*

Canadian Chemical Specifications

Canadian National Research Council will secure data on chemical specifications and report advisability of establishing national standards for specified chemical products. Leading representatives of the industry in Canada are requested to supply information on the principal materials made or purchased there according to chemical standards.

Welding Advice

Pittsburgh Testing Laboratory, which maintains laboratories, branches or personnel in principal industrial centers has organized a welding division to be known as its *National Weld Testing Bureau*. New Division will be headed by James W. Owens, internationally known welding engineer, as its director.

Equipment Company Personnel

George Quint, well known in the field of plastic refractory sales and installation, is now associated with Refractories Division, The M. W. Kellogg Co., N. Y. City . . . Because of a marked pick-up in New England business, Coppus Engineering, Worcester, Mass., has appointed Frederick D. Rogers, 80 Federal st., Boston, Mass.. to handle sales in Maine, New Hampshire, Vermont and section of Massachusetts lying east of Worcester County. This territory was formerly covered from the home office. Mr. Rogers will handle complete line of Coppus blowers ventilating equipment, turbines and generators and the Annis Dry Type Air Filter for ventilating and industrial applications . . . Struther-Wells Co., Warren, Pa., has appointed Kerr Machinery Corp., Detroit, as its representative in Michigan exclusive of the northern peninsula. It also has named National Equipment Co., Salt Lake City, as its representative in Utah, Nevada, Idaho, Montana, and Wyoming west of Rock Springs. . . . Roots-Connersville-Wilbraham, Connersville, Ind., is now represented in New England territory by Leo I. Smith, Belmont, Mass. . . . The Kron Co., Bridgeport, Conn., announces new representatives: Equipment Engineering Co., New Haven, Conn.; R. S. Kerr & Co., Atlanta, Ga.; and Equipment Engineering Co., Indianapolis, Ind.

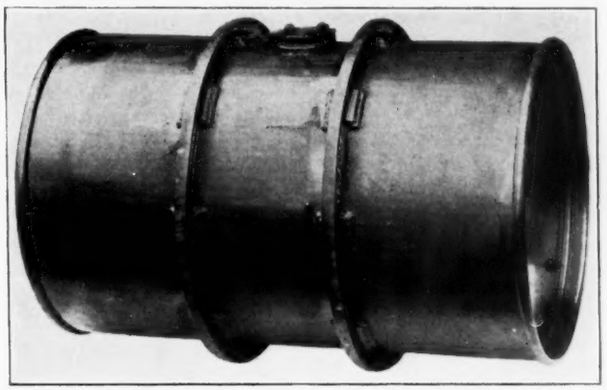
New Equipment

Bristol Co., Waterbury, Conn., has introduced a new series of time-temperature and time-pressure controllers. These instruments combine in 1 case this company's "free vane" mechanism for the operation of temperature or pressure controllers, together with an air-operated timer. New controllers are available in a range from —40 to 1,000 deg. F., or, in pressure, from 10 to 2,000 lb. In 1 model, timing cam consists of a large disk of sheet aluminum, which may be cut by the user, while in another model, a smaller aluminum cam is supplied, together with an indicating pointer for temperature or pressure.

Difficult Drum Problems

A steel drum pioneered and developed by the Republic Lead Equipment Co. and the Republic Steel Package Co., 7930 Jones Road, Cleveland, with a bonded lead lining, known as I. C. C. 5 H drum, has recently been approved by the Bureau of Explosives for transporting corrosive chemicals. This type of drum was recommended by the Manufacturing Chemists' Association and, of course, passed rigid tests before adoption by the Bureau. It has a homogeneous lead coating with a minimum thickness of 3-32 in. It will be used for such materials as sulfuric, phosphoric, and hydrofluoric acids, being satisfactory for sulfuric acid up to 1.85 sp. gr. and 66° Be., as well as numerous other corrosives whose attack is resisted by lead.

This type of drum has a number of advantages in transporting chemicals not possessed by other containers commonly used. Primarily, breakage is eliminated. This saves much loss of both containers and chemicals. It likewise should effect a large saving to carriers, for breakage in mixed cars often means damage to



other goods in the same car. This sturdy container should have a long life so far as mechanical wear is concerned. It means less handling expense because not so much care need be exercised and it means greater safety because the danger of cuts from broken containers is removed. Less storage space is required for these containers because there are no crates around them and because there are no necks requiring space and pyramiding in stacking. These strong containers may be drained under pressure, lessening the time and trouble involved in draining.

Thermoguard Motors For Safety

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has recently announced "Thermoguard Motors." These motors have a built-in disk thermostat that functions before the temperature of the insulation reaches the danger point.

Thermoguard motors are available in two types: one will be disconnected from the source of power when the temperature approaches the danger zone, and the other will give an audible or visible signal when an unsafe temperature is being approached.

On processes where an enforced motor shut-down would cause a loss of product or other hazard, the Thermoguard motor will give advance warning that an emergency exists—and corrective measures can be taken. When desirable, Thermoguard motors can be arranged to stop when their temperature is dangerously high and cannot be started until the operator manipulates the control. On unattended applications, it is possible to arrange the control so that the motor will automatically re-start when it has cooled to a safe operating temperature. The Thermoguard principle has been applied to induction, direct current, mill and high speed synchronous motors.

New Recording Line

Brown Instrument Co., Philadelphia, has placed an entirely new and improved line of 8-in. and 12-in. circular chart instruments on the market. These instruments include indicating or recording thermometers for temperatures from 40F. up to 1200F., and indicating or recording pressure and vacuum gages for ranges from 10 in. of water up to 5000 lb. All types are offered in 1, 2, or 3 pen models.

In developing this new thermometer line, much research was devoted to improving the helix mechanisms (Bourdon tubes). The mercury-filled helix is built of a special stainless steel which stands 100% overload and provides a surplus of power to move the pen. The gas and vapor type helices are made of heat-treated phosphor bronze. These thermometers may be located at distances up to 200 ft.

An electric clock eliminating daily hand winding, is standard at no extra cost for all models. Where a. c. current is not available, hand-wound clocks are furnished.

Cases are of die cast non-corrosive aluminum and are interchangeable for back or bottom connection or for flush panel mounting, permitting unlimited flexibility in installation. A great variety of sizes and shapes of bulbs are available. Also, a wide choice of standard charts is offered.

Other new features claimed, include: handy toggle switch to start and stop electric clock; combination door handle and built-in lock; automatic chart clips carried on door hold chart in place; no chart knob to lose—chart is simply pressed on chart hub; automatic pen release of powerful construction lifts pen from chart when door is opened; greatly increased torque eliminates pen friction; convenient micrometer thumb screw permits easy recalibration, if range of the instrument is to be changed after installation; felt gasket and cemented glass in door makes case dust and moisture-proof; zero adjuster is rugged and accessible.

Equipment Booklets

E10. Amthor Testing Instrument Co., 309 Johnson st., Brooklyn. Bulletin No. 108 describes direct-reading precision hygrometers, recorders, and other simple instruments used for determining accurately true air conditions.

E11. Brown Instrument Co., Wayne & Roberts aves., Philadelphia. A new catalog, No. 6702, describes in thorough detail all of the 19 features of the latest addition to the Brown line—a simpler, more rugged, more dependable recording thermometer and pressure gauge.

E12. Consolidated Products Co., 15 Park Row. A 2nd issue of "Consolidated News" lists 2nd-hand chemical equipment for sale by this well-known dealer in equipment.

E13. General Electric Co., Schenectady. GEA-1754 Leaflet describes new portable testing equipment with which desired voltage or current, over the entire range from zero to maximum, can be obtained simply by turning a crank—no change in connections or interruptions of load is necessary.

E14. General Electric . Booklet CR7505 describes Photoelectric Relays and their use in counting on automatic packaging equipment.

E15. General Electric. GEA-1800 Leaflet describes new automatic electric water heaters for industrial use.

E16. D. W. Haering & Co., 3408 Monroe st., Chicago, has issued a 16-page booklet on water treating, describing application of H-O-H treatments to various water problems and explaining in detail cause and effect of many problems common to boiler and hot water equipment. Booklet is packed with practical information and scientific data of value to the plant engineer, chemist and maintenance man.

E17. Linde Air Products Co., 30 E. 42 st., N. Y. City. September Oxy-Acetylene Tips features "Welding Non-Ferrous Process Piping" and the usual number of new and interesting bits of welding news.

E18. Link-Belt Co., 519 N. Holmes ave., Indianapolis, has issued Folder No. 1365 on conveyor chains for handling glass ware, bottles, jars or cans wherever manufactured or filled. Conveyor chains of Silent, Roller, Ewart and Pintle types are included.

E19. Metropolitan Life Insurance Co., (Policyholders Service Bureau) 1 Madison ave., N. Y. City. "The Older Employee in Industry" represents the findings in a study of over 5,000 manufacturers and 800 specific plans in actual operation. Booklet takes on added importance with the advent of the "Blue Eagle."

E20. The Nash Engineering Co., South Norwalk, Conn. Bulletin No. 217 gives a very complete resume of the Nash line of pumps designed for industrial purposes. Complete engineering data are supplied. This is the first time that all of the equipment manufactured by the Nash Engineering Company has been included under 1 cover. Bulletin describes the Nash vacuum pumps and compressors, which deliver absolutely clean air, the Jennings line of vacuum heating pumps, including the new low pressure vapor turbine type, the Jennings non-submerged type of sump and sewage pumps, the famous Jennings no-valve pneumatic sewage ejectors, and the Jennings line of self-priming centrifugal pumps. Several entirely new developments are shown including the staged Nash compressors and vacuum pumps for higher pressures and vacuum.

E21. National Electric Heating Co., (division of E. B. Badger & Sons). Bulletin No. 87 describes method of changing over present steam heated apparatus to high speed operation through use of the vapors of diphenyl and similar compounds.

E22. Struthers-Wells Co., Warren, Pa. A 4-page circular describing the new "Silver White" Line of multi-service containers (tanks) in stainless steel, also in aluminum and in Monel. Eight distinct advantages of the new light weight series are described.

E23. Surface Combustion Corp., Toledo, Ohio. Latest 4-page circular issued describes recent car bottom furnace installations.

E24. Turbo-Mixer Corp., 250 E. 43 st., N. Y. City. A 12-page booklet, profusely illustrated, reviews in detail the liquid mixing equipment manufactured by this company.

E25. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. A-62341 describes Type G High Speed Synchronous Motors; A-62320 describes a new complete line of splash and drip proof motors and control for every machine requirement.

E26. J. H. Day Co., Cincinnati, Ohio. Bul. 355 contains complete information on Day portable mixers, Day Cyclone emulsifier and several different types of colloid mills.

E27. Linde Air Products Co. "Fabrication of Oxwelded Piping" is a 160-page book for individuals concerned with work on piping systems, the necessary data and procedures for the satisfactory use of oxy-acetylene welding and cutting in making pipe joints. It supersedes "Fabrication of Welded Piping Designs" published in 1929, and contains much new material on important developments in welding methods, fittings manufactured specially for welding into a piping system, and the welding of joints in cast iron and non-ferrous piping.

E28. Schutte & Koerting Co., Philadelphia. A booklet describes the Lurgi vacuum, 2-stage, deodorizing process available for treating animal and vegetable oils.

E29. D. R. Sperry & Co., Batavia, Ill. Latest publication (32 pages) gives complete engineering specifications on company's varied line of filter presses, together with several typical installations.

E30. Mishawaka Industrial Instrument Manufacturing Laboratory, 936 Washington ave., Misawaka, Ind. Pamphlet "Pyrometers" describes Misawaka pyrometers of the indicating themo-electric type models No. 20, 30, 40 and 50.

E31. Goodrich Rubber Co., "Lubricate with Rubber" describes a new rubber belting compound.

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Chemical Markets & News

Chemical Executives Appear Before Gen. Williams in Public Code Hearing—Allied Takes No Part in Drafting Code.

Chemical industry (238 companies to date, out of a possible 400) employing revived Chemical Alliance—and represented by 50 outstanding leaders, headed by Cyanamid's William B. Bell, president of both Alliance and M. C. A., journeyed to Washington Sept. 14 and laid before Major-General C. C. Williams, NRA deputy administrator, a revised blanket code.

Most spectacular feature was the disclosure that Henry Ford's complete silence on NRA was matched in the chemical field by Allied's Orlando Weber. Allied, although Mr. Weber was elected vice-president and director in the Alliance, took no part in drafting the code, according to the information given to General Williams, who indicated that he had no anxiety over the situation.

Controversal "Merit Clause"

Public hearing proceeded with but few serious disagreements until the so-called "merit clause" (No. IX in the Chemical Alliance Code) was reached. Allowed in the automotive code, and since included in some 125 other codes submitted, blunt spoken General Johnson has emphatically stated that "No one else can have it."

Briefly summarized important features of the meeting were: J. Jay, Federation, of Architects, Engineers, Chemists and Technicians (an organization few, if any, chemical people had ever heard of) objected to minimum wage provisions as applied to chemically trained men, and urged minimum wages: $65 for senior chemists, $45 for juniors, $35 for assistants, and $30 for apprentices. Charles H. Stone, Charlotte, N. C., was unsuccessful in impressing General Williams that minimum Southern wage should be 20c an hour instead of the 25c, as stated in the Code. General Williams pointed out a very strong possibility that all sulfuric producers would be brought in under the chemical code, including producers originally included in fertilizer or zinc groups. H. I. Young, chairman of the By-Product Sulfuric Acid Committee, American Zinc Institute, asked for an amendment exempting group from Chemical Code, asserting higher wages are impossible because of foreign competition in zinc. A serious clash occurred over attempt of Texas and New Mexico potash producers to obtain exemptions for unskilled labor. Serious objections were raised by the Deputy Administrator to clause XIV (in which a specific time limit, Dec. 31, 1933, was placed on the Code). Charles Pfizer's attorney, Albert R. Palmer, offered 2 amendments, 1 dealing with manner of handling confidential data gathered by the Alliance and its proper disclosure, and the other to insure equal rights on possible future amendments for those joining the Alliance at a later period.

One surprise occurred. General Williams advised that all codes must contain following:

"In addition to the information required to be submitted to the code authorities, there shall be furnished to government agencies such statistical information as the administrator may deem necessary for the purposes recited in Section 3 (a) of the National Industrial Recovery Act."

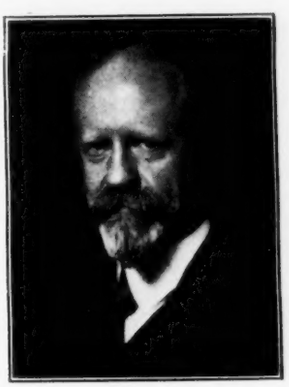
Mr. Bell offered serious objections to such provision on the ground that it might lead to disclosure of highly confidential material. General Williams reported, however, that he was merely following instructions, and that reason for such provision was due to many industries failing to report any longer on statistics they had previously been sending to the government on the ground that codes did not require them to continue to do so.

Final Steps

After further study by NRA officials the Chemical Code Committee will again assemble in Washington and attempt will then be made to whip the Code into shape for President Roosevelt's signature.

Interesting statistics presented: The 238 present members (which include practically all of the largest producers) employ between 50,000 and 60,000. If the remaining possible members join the Alliance industry will show employment of between 60,000 and 70,000—a very small factor in a nation-wide attempt to improve unemployment conditions, when comparison is made with most other basic industries of like importance—steel, textile, automotive, etc. Statistics introduced showed that unemployment in chemical industry reached low in 1931 and since then has been improving. Weekly earnings of chemical employees are within 90% of 1926, while in all industries average is only 68%.

Chemical Alliance has made a few changes in its constitution and by-laws. One of these makes approval by board of



Cyanamid's William B. Bell

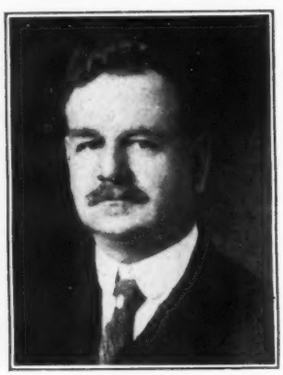
NRA's General C. C. Williams

Leading figures in Chemical Alliance's Code Hearing Sept. 14

directors unnecessary for admission to membership. Another sets up new basis for distribution of assessments, so that the expense would be divided according to the number of persons employed by members. The 3rd change provides that a parent company shall exercise voting right for its subsidiaries, based on total number of employees of the group

Distributors Organize

American Oil & Supply's Curtis R. Burnett, elected Sept. 8 at the organization meeting of the Institute of Chemical Distribution, reports a rapid increase in the membership in past 3 weeks. Organization plans, he announces, are rapidly being completed.



"Formation of Distributors' Institute is a forward step"— Curtis R. Burnett

In a statement prepared by the officers the aims of the Institute are briefly summarized:

"Chemical industry has taken a forward step in the formation of the Institute of Chemical Distribution. Institute is not organized for profit, and its objects are to increase efficiency of the distribution system of the American chemical and allied industries by studying costs and methods, surveying markets and uses, and keeping its members informed on facts, figures, and new developments in distribution, to promote co-operation and fair treatment among manufacturers and producers, dealers and sales agents, common carriers and law makers; to prevent restraint of trade and promote upright dealings within its own ranks, and to secure for consumers the economies and efficiencies resulting from honest, profitable and intelligent marketing of the chemical raw materials of industry.

"Membership is open to any corporation, partnership, or individual engaged in the wholesale distribution of chemicals or allied products. A Code of fair competition for chemical distribution will be filed in November. Code will be supplementary to the Code of Chemical Industry, sponsored by The Chemical Alliance, Inc. and will further reflect the needs of specific lines as indicated by their various sub-codes.

This organization will be the only 1 of its kind in the chemical industry and will eliminate the necessity for a distributor of chemical products subscribing to more than 1 chemical code. Hence membership in the Institute of Chemical Distribution will be distinctly of value to the chemical distributor"

Temporary headquarters have been established at 238 Wilson ave., Newark, N. J. (American Oil & Supply headquarters). Constitution and membership planks are available.

Equipment Institute Plans

Chemical Engineering Equipment Institute (formed Aug. 28, see CHEMICAL MARKETS, Sept., p. 233) has added several new members. Secretary D. H. Killeffer reports John F. Abernethy & Co., Brooklyn; Briggs Boiler Wlks., Akron; Chemical Equipment Co., Montpelier, Ind.; Isolantite, Inc., Belleville, N. J.; Maurice A. Knight, Akron; Louisville Drying & Machinery, Louisville; New England Tank & Tower, Everett, Mass.; Spraco, Inc., Somerville, Mass.; Swenson Evaporator, Harvey, Ill.; Arthur Wright & Associates, N. Y. City; Zaremba Co., Buffalo; and Robinson Mfg. Co., Muvey Pa., are now either members or awaiting election.

Nominating committee, Arthur Wright, chairman, and J. E. Moul, (Turbo-Mixer), Maurice A. Knight, W. H. Scott, (Duriron), and Eugene C. Clarke (Bethlehem Foundry & Machine) are selecting list of candidates for the executive committee to be presented to 1st annual meeting scheduled for Oct. 31 at the Chemists' Club (N. Y.).

Code is now completed and has been submitted to Washington. As yet "Fair Practices" Section has not been released for publication.

Recovery Signs

Payrolls 11% higher in August; jobs increasing 6%; 750,000 employed during the month; $12,000,000 added to factories' wages ($40,000,000 in 5 months); a gain for 81 out of 89 industries; are some tangible results claimed for NRA's Blue Eagle and definite signs that recovery is a fact. Madam Secretary Perkins announced Sept. 15 that 2,200,000 have been returned to work since March, but warned of overconfidence, pointing out that employment was still 28.4% and payrolls 58% below 1926 (Labor Dept.'s average year for statistical purposes).

American Federation of Labor's Green Sept. 27 estimated 2,800,000 returned since March—11,001,000 still idle.* Endorsing the President's recovery plans said Labor's most prominent spokesman: "The President's re-employment program in its 1st month brought greater progress in employment than in any month since the depression."

Chemical Employment

Chemical employment rose 7.7% and payroll totals 5.7% in August. Employment was 25% better than the general average in August; payroll totals were almost 37% better.

Employment showed a better than average gain from preceding month and in comparison with August, 1932. Payroll totals did not reach the general average in the increase from July or from the 1932 level. Average chemical wage in August was 20.7% below 1926; wages in industries in general averaged 27.5% less than in 1926.

Employment

	Aug., 1933	*July, 1933*	*Aug., 1932*
Chemicals	113.6	103.0	81.3
Cottonseed, oil, cake, and meal	37.3	31.4	27.5
Druggists' preparations	71.7	69.9	68.2
Explosives	91.3	83.3	69.2
Fertilizers	50.9	46.5	34.2
Paints and varnishes	80.0	78.7	66.0
Petroleum refining	66.0	64.7	62.8
Rayon and related products	188.3	167.6	92.8
Soap	110.9	101.5	93.3

Payroll Totals

	Aug., 1933	*July, 1933*	*Aug., 1932*
Chemicals	82.2	75.5	58.6
Cottonseed, oil, cake, and meal	36.0	30.9	28.1
Druggists' preparations	71.5	66.6	65.7
Explosives	67.8	68.5	43.6
Fertilizers	32.6	29.8	25.2
Paints and varnishes	60.2	61.5	48.7
Petroleum refining	55.0	54.5	56.2
Rayon and related products	156.3	140.1	74.5
Soap	86.0	84.9	81.5

N. Y. State chemical employment increased 4.7% between middle of July and middle of August in N. Y. City increased 1.4%.†

	August compared with July (percentages)	
	State	*City*
Drugs and industrial chemicals	+8.2	+2.4
Oil products	+2.4	+2.4
Paints and colors	—2.5	—3.9
Photographic and miscellaneous chemicals	+5.2	+12.2

In The Courts

U. S. Circuit Court of Appeals (for 3rd District) in a decision rendered Sept. 20 upheld decision of District Court of the U. S. (for the Western District of Pennsylvania) which denied that Selden (Cyanamid's subsidiary since 1930) had infringed General Chemical's famous Slama-Wolf vanadium sulfuric catalyst, patent No. 1,371,004. Lower Court decision was made by Judge Nelson McVicar, June 17, 1932.

In its opinion Court stressed the fact that Prof. Scott of General Chemical's research staff had reported during the War an efficiency of but 86.2 "which," quoting directly, "would make the catalyst commerically useless."

Summarizing Court pointed out: "In Rohm v. Martin Dennis Co., 263 Fed. 388, we found an American patent, based on a German one, had instructions which did not instruct. In the present case it

*A. F. L. while in convention at Washington reported 3,000,000 back at work at the end of September—10,350,000 still unemployed.

†Forty-five thousand were added to payrolls in N. Y. State in September.

may well be that the alleged success of this patent in Germany may be due to some feature which was not disclosed in the application. At any rate, we are clear that the court below correctly held that this patent, instead of promoting the art, was a mere paper one whose function was words, not work, and which, if valid, must be confined to its own narrow limits. So construed, the court committed no error in holding it was not infringed."*

Du Pont Answers Green

Lammot du Pont, du Pont's president and a former M. C. A. president, made prompt reply to A. F. L.'s Green and the latter's attack on du Pont employees' representation plan:

"This plan," said Mr. du Pont, "does not provide for a labor union, nor a company union, nor is it an 'organization' of any sort. It is simply a plan offered to employes whereby they may elect representatives, and whereby those representatives may confer with an equal number of representatives of the plant management, and discuss employe-employer relations and make such requests upon the management as the representatives see fit. No membership is required of the employe, no dues are required and no expense to the employe is involved.

"It is the belief of the management of E. I. du Pont de Nemours & Co. that company's employes may organize under the A. F. L., if they see fit," Mr. du Pont said, "or they may join any other union, if they see fit; or they may cooperate through an employes' representation plan, if they see fit; or each employe may bargain individually. Contention of the A. F. L. seems to be that N. I. R. Act compels employes to organize only "under the A. F. L."

New Plasticizers

Monsanto has just placed on the market 3 new plasticizers, additions to the company's line of "Santicizers." New products are designated Santicizer E-15 (Ethyl phthalyl glycollate); Santicizer M-17 (methyl phthalyl glycollate); and Santicizer B-16. Santicizers E-15 and M-17 are high-boiling, non-toxic, solvent plasticizers for cellulose acetate; Santicizer B-16 is especially developed for cellulose nitrate. Complete data on specifications and special uses are available from the technical department of the company.

Carbon Dioxide Institute has been formed with N. Y. City headquarters to bring together producers and to further best interests of the industry.

*See CHEMICAL MARKETS, July, 1932, p. 53; for detailed discussion of the District Court's decision; also May, 1932, p. 467, for history and discussion of questions involved. Suit has been one of the most bitterly fought in the history of U. S. chemical industry. Court benches were crowded at original trial by a dozen or more outstanding technologists of this country and several from abroad.

Association News

Ageing Wine

Tall and thin, shy and reticent, abstemious Dr. Charles Raymond Downs, recognized nation-wide as an outstanding technologist and consultant, member of well-known Weiss & Downs, easily stole the lead at the A. C. S. Chicago Meeting (Sept. 9-15) with his announcement of synthetic ageing of wines with malic acid, produced by a new process of passing current of air over benzine and naphthalene in the presence of a suitable catalyst.

For 1st time in A. C. S. history registration passed the 3,000 mark, B. E. Schaar winning the "Pool" with a guess of 3,200. World's "premier" technical gathering, somewhat analogous to the 3 ring circus bewildering because of its many divisions, and subdivisions, attracted record number of papers, indicating slight, if any, "research moratorium" in America's leading laboratories.

Willard Gibbs Medal (dubbed by *Time's* Science Editor "A Salute to Achievement" as contrasted with Langmuir $1,000 Prize—"A Salute to Promise") was bestowed upon German Dr. Richard Willstatter. University of California's Dr. Frank Harold Spedding was the Langmuir Prize Winner (given each year by Industrialist A. C. Langmuir in honor of his more distinguished scientific brother, G. E.'s Irving, latest Nobel Chemistry Prize recipient.

High point in entire week of intensive reporting of scientific achievement was reached at the banquet given in honor of A. C. S. veterans of the Columbian Exposition meeting of '93.

Microphone played a leading part for the 1st time in the Society's publicity plans. On the Sunday preceding the meeting Leather Authority R. E. Wilson, general chairman of the Local Committee, broadcast "A. C. S. and Its Convention;" Monday, Harvard's Arthur Becket Lamb, A. C. S. president, "A Century of Progress in Chemistry;" Tuesday, *I. E. C.* Editor, Harrison E. Howe, "Chemistry in Modern Society." Wednesday the Willard Gibbs Medal proceedings were "aired," and on Thursday happenings at the dinner to U. S. chemical industry's "grand-old-men" reached out in 4 directions interpreted in turn by Oil Authority Dr. Gustav Egloff, Dr. W. Lee Lewis, Northwestern University and inventor of "Lewsite" and Bakelite's Dr. L. V. Redman.

At a well-attended business meeting President Lamb was instructed to appoint a committee to consider and prepare if necessary (if this seems desirable) a general all-embracing code to take the place of several already drafted and submitted by chemists in consulting practice, analysis etc. Abstracts of Chicago Meeting papers are available through A. C. S. News Service, 706 Mills Bldg., Washington. Many of the more important are published as space permits in Society's technical *Industrial & Engineering Chemistry.*

Veteran Secretary Charles L. Parsons reported finances good under present circumstances. Nevertheless, certain changes were adopted relating to dues, costs of the several Society publications, etc., to ease drain on present surplus.

Fink Donates

Electrochemical Society's 64th Meeting held at Chicago Sept. 7-9 featured a "Faraday Day," and Colin G. Fink, Columbia's famed electrochemist (most noted for chromium plating patents) who received $1,000 (check) and a handsome medal (gold). Honor is known as the Acheson Award. Prof. Fink startled fellow-electrochemists, still thinking of depression, with announcement that the $1,000 gift would be set aside as a fund to help needy young scientists starting in on electrochemical research.

Moore Paint Chemists' Head

Dr. Robert J. Moore of the Bakelite Corp., Bloomfield, N. J., was elected chairman of the A. C. S. paint chemist group at the recent Chicago meeting. Wayne R. Fuller, Pratt & Lambert, Buffalo, was named chairman-elect and Roy H. Kienle, Calco Chemical, was re-elected secretary of the group. Mr. Kienle has just gone with Calco from G. E.

J. H. Schmidt, Bakelite, read a paper on "Synthetic Resins" a general review of resins and their applications in various fields. D. R. Wiggam and W. E. Gloor, Hercules Powder, presented a paper on "Cellulose Compounds and Lacquers." W. J. Sweeney and J. A. Tilton, Standard of Louisiana, delivered a paper on "Properties of Hydrogenated Solvent Naphthas." Hero of the meeting was Dr. Alex Schwarcman, Spencer Kellogg's chief chemist who, insisted on reading his paper on drying oils although quite ill.

Drug, Chemical and Allied Section, N. Y. Board of Trade, is opposing N. Y. State sales tax on samples.

Obituaries

William G. Porter, 65, treasurer of Independent Salt, subsidiary of International Salt, died Sept. 12.

Mrs. Clara Hoage Patten, wife of William D. Patten, Westvaco Chlorine vice-president and president of Monarch chemical, a subsidiary, died Sept. 6. Theodore J. Dosch, 52, sulfur producer, former manager Niagara Sprayer & Chemical, died in San Bernardino after

an automobile accident. Frank D. Carney, 68, famed metallurgist (Bethlehem Steel) died Oct. 3. James P. Milwood, 65, chief chemist, Oakonite Co., Passaic, N. J., died Sept. 24. J. Stuart Royster, 48, Washington chemical dealer, president, Royster Products, died Sept. 8, it is believed, from acute indigestion. Frank W. Miller, 55, formerly with Semet-Solvay, and for the past several years in charge of by-products division, Sloss-Sheffield Steel & Iron, Birmingham, died Sept. 1.

Foreign

Nitrogen Agreement

Reports from abroad indicate a Belgian-Chilean nitrogen agreement which deals, however, only with the Belgian market, and is said to arrange a fixed differential between synthetic and natural nitrate prices. In Great Britain indications point to a possible "price understanding." Early in August I. C. I. set the synthetic nitrate price at £7 5s. for delivery up to next June. During the last part of August Chilean material was reduced by 27s. 6d. per ton for August delivery. Shortly after British synthetic material was raised to £7 8s. 6d., Aug.-Oct. delivery; £7 11s., Nov; £7 13s. 6d.; Dec. £7 16s., Jan.; £7 18s. 6d., Feb.-June. These prices are the same as those quoted for Chilean nitrate.

Chemical Trade Journal (British) said editorially Aug. 25. "Whether these price alterations are the result of an Anglo-Chilean understanding in nitrate is a matter for surmize, though the maintenance of the price differential between nitrate and ammonium sulfate in this market, and the issue by the Nitrate Corp. of Chile of exactly the same price schedule as the I. C. I. in regard to nitrate, both point in the above direction."

Chile Nitrate

New Chilean "free selling" policy has caused considerable expansion of sales of Chilean natural nitrate both here and abroad. Nitrate sales to Europe, Chile's chief market, are double those of last year. This indicates that the natural nitrate industry is now retrieving business it lost during the past year to American synthetic manufacturers.*

Chilean Government is still liquidating Cosach and is organizing in its place a sales corporation which will operate independently of the production end of the fertilizer industry. The 1934 Chilean budget does not anticipate any income from nitrate and iodine taxes which was placed at $140,000,000 in last year's budget.

Danish banking interests and the Nitrate Corp. of Chile have signed a private agreement in Copenhagen designed to stimulate Danish-Chilean trade, according to reports circulated in Santiago Oct. 1.

Agreements provide for importation of 40,000 tons of nitrate before middle of 1934. Part of credit created will liquidate Chilean debts in Denmark.

Great Britain

Great Britain continues to strengthen the chemical tariff structure. On Sept. 5 duty on aluminum sulfate, ammonia, soda, and potash alums was raised from 20% ad valorem to £2 a ton; aluminum hydrate, £3 a ton. Lactose is now duitable at 3d. per lb. Recent increase in importations of alum and aluminum sulfate at the expense of home industry is responsible for change. The Import Duties Advisory Committee give notice of the following applications: (a) For an increase in the import duty on —commercial grades of disodium and trisodium phosphates; raw gypsum stone (calcium sulfate); plaster of paris; mineral white (ground gypsum); calcium sulfate cements. (b) For the addition to the Free List of pitch, or, alternatively, for drawback of duty under Section 9 of the Finance Act, 1932, on the pitch used in the manufacture of fuel briquettes.

British Import Duties Advisory Committee recommended Sept. 14 further continuance of license requirements for imported dyestuffs. Committee recommended retention for another year of those provisions requiring licenses for dyestuffs and intermediate products (exclusive of colors and coloring matters and printers' inks), but removal of present day of 10% ad valorem on dyestuffs admitted under license.†

I. C. I. offer to purchase shares and option certificates of Chemical and Metallurgical Corp., Ltd., has been accepted by over 90% of the holders of preference and ordinary shares and option certificates, and has, become effective.

James Tennant, 83, grand old man of the British chemical industry, died suddenly Aug. 29. He entered firm of Charles Tennant & Co., Ltd., Glasgow, early in life; later became chairman and manager, Alexander Ferguson & Co. When this firm merged with United Alkali he became a director of the latter. Despite his age he travelled daily from his surburban home into Glasgow up to a week before his death.

Another distinguished British chemical industrialist, Edmund Peel Potter, 86, founder of the bichromate producing firm, E. P. Potter & Co., died Sept. 6. He was widely known for his philanthropy.

British Chemical Union is demanding 80s instead of 60s wages and 40 instead of 48 hour week. Membership is 5,241 workers in fine chemical and drug section of chemical industry.

Soviet Chemical "Threat"

With Soviet recognition, according to some authorities allegedly close to Administrative circles, a matter of but a few months at the most, Russian foreign chemical trade becomes more than of abstract interest. Aside from alkalies Russia is yet to become a "menace" to other large chemical exporting countries, Five-year plan to the contrary. Jump in '33 alkali exports are, however of importance to countries active in alkali export trade. Comparison of 1st 6 months of '32 and '33:

Imports

	1932		*1933*	
Commodity	*Quantity (metric tons)*	*Value (1,000 rubles)*	*Quantity (metric tons)*	*Value (1,000 rubles)*
Exotic gums and resins	1,179	1,426	177	135
Chemical prods	6,281	2,030	3,401	1,184
Sulfur	1,095	78	2,036	113
Saltpeter	941	167	501	65
Vegetable oils	6,111	1,661	280	66
Tanning materials	307	75	908	143
Dyes and dyestuffs	1,389	662	1,434	448
Copper	7,000	3,010	2,144	585
Nickel	1,491	2,630	841	1,342
Aluminum	6,738	4,980	7,098	4,863
Tin	2,156	3,034	1,300	1,429
Lead	19,008	2,594	7,115	582
Zinc	7,217	1,005	3,046	368
Scientific apparatus	844	7,134	551	3,815
Oilseeds	165,568	6,708	52,997	1,939
Flax and tow, flax waste	53,120	14,602	56,199	14,075
Wood-distillation products	7,547	585	5,417	767
Oil cake	263,923	8,539	234,884	7,671
Manganese ore	223,355	1,996	261,519	1,689
Asbestos	6,635	935	11,102	1,386
Petroleum and products	2,657,943	47,687	2,552,931	44,947
Soda, ash, caustic, bicarbonate	17,602	967	37,031	1,861

Japanese Government Aid

Japan, speedily building up a self-sufficient heavy chemical industry (to a large extent with government aid), is now turning attention to so-called secondary chemical industries. Dyestuff production is now to receive immediate attention.

As a 1st step toward making this policy effective, an appropriation of 300,000 yen will be carried in the budget for the coming fiscal year, to be used for encouragement of production of 28 different kinds of special dyes. Most of the funds will be allotted the Institute for Industrial Research and the chemical branches of the Imperial universities. It is reported, however, that the Government plans also to make substantial grants to firms engaged in the production of dyestuffs.‡

Japan is one of the few countries to have shown a marked improvement in its chemical trade, both in 1932 and in the 1st half of 1933. Not only have the

*Exports to all markets for '33 are officially estimated at 1,200,000 tons compared with total '32 shipments of 722,000 tons.

†Restrictions were originally adopted in Dyestuffs Act of 1920, which prohibited importation, except under license from the Board of Trade of all synthetic organic dyestuffs, colors and coloring matters and all organic intermediate products used in their manufacture. Measure was originally to expire on Jan. 15, 1931, but has since been continued from year to year despite better opposition from textile field, particularly in the past 3 years.

‡Imports of synthetic dyes into Japan last year totaled 9,066,438 yen, of which the U. S. accounted for 1,157,000 yen; Germany 4,959,000 yen and Switzerland 2,025,000 yen. Imports from U. S. consist chiefly of indigo and direct cotton dyes.

quantities of many of the individual items increased greatly, sometimes more than doubled, but the values have recorded still larger increases in many instances. In Japanese currency exports of chemicals and allied products increased 29% in 1932 to 45,559,000 yen, but declined in dollar value 25% to $12,800,000, compared with 1931. Imports, likewise, showed similar differences—an increase of 3% in yen to a total of 95,053,000 yen, but a 40% drop in dollars to $26,700,000. Still more significant increases were registered in the 1st half of 1933 when exports of principal chemical products gained 58% in yen to 28,668,000 yen in comparison with similar products for the 1st half of 1932, but increased only 20% in dollars to $6,400,000. Imports of principal chemical products during the 1st half of 1933 gained 8% in yen to 6,600,000 yen, but dropped 14% in dollar value to $14,800,000. The decided trend of Japan toward greater production of many chemical commodities formerly imported was evident during these periods, with considerable increases in exports of some industrial chemicals, sulfur, low-priced coal-tar dyes, and paints.

Italian Chemical Trade

Italian foreign chemical trade during 1st 4 months of 1933 surpassed figure for corresponding period of 1932, but was less than the similar period of 1931. Exports for the period were valued at $7,000,000 and imports at $7,500,000. Of interest in the outgoing trade was the marked increase in shipments of crude sulfur, bergamot and lemon oils, copper sulfate, and ammonium sulfate. Although the quantities exported of citric acid, tartaric acid, citrate of lime, and crude tartrates, all commodities in which Italy formerly was the chief world producer, held up and in some cases exceeded preceding years' figures, values were only about half as much. In the import trade large losses were registered in copper sulfate, sodium sulfate, and acetate of lime, and marked increases in acetic acid and most of the organic acids, acetone, and a few other industrial chemicals.

Norwegian Sulfate Soon

Norsk Hydro-Elektrisk Kvaelstofsktieselskab, most important Norwegian nitrate manufacturer, will construct addition to its Heren plant for sulfate manufacture, a product which this company has not previously made.

Plant is expected to be completed in about a year, and, according to reports, will cost several million kroner. Norwegian consumption of sulfate is negligible and product will be sold abroad.

Norsk Hydro has refused information regarding capacity. Company's new soda ash plant is practically completed and will be opened during the fall. Capacity, 15,000 tons per year.

Washington

Inflation and Prices

Chemical industry in common with other industries watched currency inflationary ballyhoo in Washington led by Senators Harrison, Thomas, Bankenhead and others with intense interest, wondering what the monetary policy of the Government in the next 12 months will be and what effect it will have.

Going off the gold standard and the threat of currency inflation (either reduction of the gold content of the dollar or issuance of fiat money) has had the effect of raising prices of commodities imported. Despite the generally accepted statement that the U. S. is now chemically independent, the chemical industry is dependent upon outside sources for a very long list of important raw materials, to mention but a few, many of the oils, chalk, whiting, chrome ore, platinum, manganese, most gums and waxes, etc. Inability to be able to contract ahead for any appreciable period leaves chemical producers using these raw commodities in a precarious position. On the other hand the depreciation of the value of the dollar when measured in foreign currencies has permitted wider exportations of chemical products, permiting manufacturers to capture markets formerly closed because of the high value of the dollar. One mixed fertilizer producer has reported that it has shipped more material in the past 3 months to a certain European country than it had done in the 3 years previous to the abandonment of the gold standard. But whether the Administration continues to inflate through extending further enormous credits, or lowers the gold content of the dollar, or resorts to the simple expedient of running the presses, chemical producers will find it difficult to determine 1934 contract prices. Add the NRA angle and the problem is still further complicated.

New NRA Policies

NRA Consumers' Advisory Board adopted, Sept. 8 as a policy opposition to general price fixing provisions, direct or indirect, in all codes, with the exception of a limited number of "natural resource" industries where cut-throat competition has led to public disaster.

In cases where price fixing is permitted for a trade or an industry generally, Board, as an outline of policy to guide the efforts of its special representatives in the framing of the NRA codes, urged that definite public responsibility for reasonableness of the prices set be fixed upon the Code Authority, with provision for review of prices set by the NRA Administrator.

Where codes bar selling below cost, Board recommended that its special representatives endeavor to secure provisions to permit public to be enlightened on what the cost in question is. Otherwise, Board held, a provision against selling below cost becomes a one-sided proposition, with the consuming public on the outside.

Definite action by N. R. A. to curb profiteering by certain industries now operating under codes of fair competition will be taken.

As a result of complaints by retailers that manufacturers of specialized products in which competition is limited have boosted prices out of all proportion to increased costs under their codes, public hearings are to be ordered at once. Hearings are to be conducted by Deputy Administrator A. D. Whiteside who is now preparing notices requiring a number of manufacturers to publicly justify their price advances.

Code Progress

Several of the codes of the chemical (using the term in a broad inclusive way) industry reached the public hearing stage in September and the 1st few days of October. Fertilizer hearing (Sept. 6); Chemical Alliance (Sept. 14); and Paints (Sept. 26) are reported elsewhere. Soap industry's hearing 1st scheduled for Sept. 28 was postponed to Oct. 5. On the same day the liquified gas industry, as represented by the National Bottled Gas Association claiming to represent 75% of the industry, had a hearing before Deputy Administrator Philip C. Kemp. Two days earlier the hardwood distillation industry, as represented by Wood Chemical Institute and claiming 85% representation appeared before Deputy Administrator Williams.*

Code as presented fixes a maximum work week of 40 hours averaged over 6 months period, not more than 48 hours in any 1 week or 8 hours in any 1 day, except: Employees in executive capacity earning in excess of $150 a month; outside salesmen; night watchmen; teamsters and truck drivers (40 hours per week over 6 months period and affecting not more than 10% of employees): employees engaged in continuous process operation where restriction of hours would reduce production (not to exceed 48 hours per week); chemists and clerical employees in communities in less than 1,500 population (48 hours per week); employees engaged in emergency and maintenance work (time and one-third for hours in excess of 10 per day).

Minimum wages not less than 30c per hour in eastern and western division and not less than 25c per hour in the southern division; males between 16 and 20 years of age and those physically handicapped and females in southern division, minimum

*H. C. McKenzie, H. C. McKenzie Co., Walton, N. Y., claiming authority to speak for small producers in Delaware (N. Y.) County, protested code of the Wood Institute would lead to monopoly and oppression of small plants. NRA officials criticized minimum wage and minimum price provisions.

wage not less than 80% of minimum wages elsewhere; all employees paid on salary basis $14 per week.

National Potash Producers' Association and the National Borax Producers' Association have filed a joint code of fair competition. Request is made for special labor and wage concessions because of isolated plant locations.

Salt code industry (2nd chemical code to be approved by the President—1st was lime). In addition to containing basic hours and wages provisions, also outlines a number of matters to be deemed as unfair practices, these including secret allowances by way of discounts, brokerage, storage, or advertising. It also provides for a study of costs by the code committee.

Quicksilver industry has received approval of modifications of its code under Presidential Re-employment agreement. Changes related to wages and hours clauses which provide a 40-hour week for factory employees and a minimum wage of 40c an hour unless lower on July 15 and in any event not less.

Personal

A Logical Choice

Chemical industry's NRA industrial advisor is Francis P. Garvan, president, Chemical Foundation and staunch champion and defender of a strong and competitive domestic chemical production, guaranteeing country against any outside domination.

Liaison officer between NRA and Chemical Industry—Francis P. Garvan

His associations with things chemical go back to the early war period when he was appointed Manager of the N. Y. City office of the Alien Custodian. On March 4, 1919 he became Alien Custodian. In these capacities he came in direct contact with foreign chemical operations in this country and abroad. His election as President of the Chemical Foundation quite logically followed.

"No Fuss"

Harvard's new president, James Bryant Conant, 41, 3rd scientist in 293 years to be drafted from the laboratory to run the University (named May 8 by Harvard Corporation, confirmed June 22 by Board of Overseers) winner in '32 of both the Chandler and the William H. Nichols medals, flatly refused to permit "any fuss," as he marched across Harvard's famous yard to assume the presidency of country's oldest educational institution.* Addressing his first freshmen class President Conant, still retaining the proper scientific approach, lectured: "May I suggest that your college career is an excellent time to cultivate a tolerant, skeptical spirit. No one need worry lest he have too few prejudices."

A Watchful Eye

C. C. Concannon, chief of the chemical division (Bureau of Foreign & Domestic Commerce) sailed for Europe Sept. 30 to attend Association of British Chemical Manufacturers meeting Oct. 12. He plans to return early in November.

Alcohol-ic Diversion?

Major Chester P. Mills, former N. Y. prohibition administrator and 8 others went to trial Sept. 14, charged with conspiracy to divert industrial alcohol. Indictment charged that Major Mills was head of Kant-Freeze Co. where large quantities of commercial alcohol were taken to Tri-Boro Chemical, Great Neck, L. I., to be "cleaned" for bootlegging.†

From Soap

Sidney M. Colgate, left an estate worth $10,689,952 when he died Nov. 10, 1930, a transfer tax appraisal shows.

E. Deutz, export and import manager, Natural Products Refining (for years Klipstein's tanning materials expert) returned to his desk after several weeks absence. He was severely injured in a fall.

Sir John Cadman, G.C.M.G., D.Sc., has been awarded Melchett Medal of the Institute of Fuel for 1933.

Rubber

Societa Italiana Pirelli, Milan, has joined in International Latex Processes, Ltd., new enterprise formed at the end of last year to consolidate (outside U. S.) whole range of patents and technical knowledge held by Anode Rubber Co., Ltd., and U. S. Rubber, within the field of the direct use of rubber latex for manufacturing purposes.

Columbia Alkali has recently put on the market new reinforcing calcium carbonate pigment "Calcene" for rubber.

British rubber industry leaders, headed by Sir Stanley Bois, have organized Rubber Producers' Research Association for the purpose of "extending application of rubber and rubber latex and derivatives." Management will be under a council.

New Construction

Heavy construction awards showed a 3rd consecutive increase in the week ending Sept. 25, according to *Engineering News-Record*, and reached $41,206,000, which is the 2nd largest weekly total of the year.

Chemical industry failed to duplicate last month's record-breaking series of announcements (Southern Alkali's Corpus Christie plant, Dow's new sea-water bromine plans, and Merrimac's entrance into the alcohol field); it could hardly be expected to do so.

Salem Oil & Grease is building a new laboratory at Blubber Hollow, Salem, Mass. New structure, 70 ft. long, 2 stories high, will house storage facilities, sulfonating rooms, and laboratory. Alabaster Lime will construct an addition to its plant at Siluria, Ala.

Recent installations of the Semet-Solvay ignition arch process for carbureting water gas with heavy oil, and gas oil have been made in a number of New England and Southern plants. Among installations are those for Jacksonville (Fla.) Gas Co.; Florida Power and Light, at Miami; and St. Augustine Gas and Electric.

Industrial Sylvania is constructing new wharf and acid storage facilities for 1,100 tons near plant at Passapatanzy, Va. Canadian Industries has actually started erection of new addition to the "moisture-proofing" (Cellophane-like) materials building. Prouty-Bowler Soap, Des Moines, is installing new machinery. Latest news of Dow's bromine plant is that production will start in December. Apothecaries Hall is planning to rebuild burned fertilizer plant. Barium Products is also planning to rebuild at Modesto, Calif. Du Pont Rayon is planning a $3,000,000 expansion program at Old Hickory.

Company News

Cyanamid has installed continuous experimental flotation unit (capacity 200-300 lbs. per hour at Warners' laboratories. Practically any desired mining flow-sheet can be duplicated.

Joseph Turner & Co. has opened a Providence office at 36 Exchange Place—phone Gaspee 3771. Stocks are now carried at Providence, Springfield and Boston. Parke H. Masters is resident New England sales manager.

*But 150 witnessed simple ancient ritual which took but 14 minutes. Silver keys used since 1846, college charter of 1650, and seals of 1650 and 1912 were used at the ceremony. Pres. Conant has just been elected honorary fellow, Emmanuel College, Cambridge.

†Trial judges ordered dismissal of charges against Major Mills Oct. 9. Government did not establish prima facie case.

Marshall Dill, Los Angeles, and San Francisco, has been appointed selling agents for California by Glyco Products, Bush Terminal, Brooklyn. They will service the newer emulsifiers, synthetic resins, and waxes and other specialties.

J. M. Mathes, Inc., New York advertising agency, has been appointed, effective Jan. 1, 1934, to handle advertising of National Carbon Co. and Carbide & Carbon Chemical Corp., both of which are subsidiaries of the Union Carbide.

Sylvania Industrial has added over 150 to its Fredericksburg payroll since July 1.

C. F. Burgess Laboratories are now located at Freeport, Ill.

National Oil Products has gone to 5-day week. Offices, laboratories and plants will be closed Saturdays.

Larusetta Chemical organized at Buffalo, by Anthony Zarrillo to operate a plant for the manufacture of household chemical products.

Clinton Corn Syrup Refining has changed its name to the Clinton Co. and its subsidiary to Clinton Sales Co., Inc.

Now Consultants

Dr. George Barsky, whose resignation from Cyanamid was reported in August CHEMICAL MARKETS, is now a consultant at 521 5 ave., N. Y. City. He was Cyanamid's director of experimental laboratories, and since the death of Guy H. Buchanan in '32, served as acting chief technologist.

Dr. Lloyd A. Hall, Chicago, and Dr. Roger W. Truesdail, director Truesdail Laboratories, Inc., Los Angeles, announced a recently formed association between these two laboratory groups.

Ernest B. Miller is now consulting engineer, specializing in sulfuric acid, superphosphate, and silica gel processes in various industries, and is located at 1703 Court Square Bldg., Baltimore, Md.

Dr. T. S. Taylor, former chief research physicist for Bakelite, has opened research laboratories at Caldwell, N. J.

Personnel

A. C. S. Scientific & Technologic Monographs Editors in search for an author for Monograph "Fixed Nitrogen" combed the field and finally selected Harry A. Curtis. When the Tennessee Valley Authority undertook to pick a chemical engineer they reached identical conclusion. "Who's Who in Chemical Industry" reports that Dr. Curtis is a former Yale, Colorado, and also Northwestern professor; chief of the nitrogen survey, U. S. Government, 1923-24; Member of President Coolidge's Muscle Shoals Commission; that during the War he was actively engaged in the government's frantic search for nitrogen. According to Dr. H. A. Morgan, member of the Authority (in charge among other things of fertilizer matters at Muscle Shoals) Dr. Curtis will be in charge of fertilizer production and "would attempt to develop an inexpensive method of production."

Derby, Sr. Appoints Derby, Jr.

H. L. Derby, Jr. (son of the president of American Cyanamid & Chemical) was appointed, Sept. 13 manager, Chicago District, with headquarters at 20 No. Wacker Drive, Chicago. District embraces territory West of the State of Ohio extending to the Rockies.

Celluloid Rewards

Celluloid Corp. has appointed Ralph S. Gavitt Chicago district manager, covering sales of the Sheet, Rod & Tube Divisions; the Protectoid Division; Chemical Division; Specialties Division; and also Amerith Inc., and Art Ivory, Inc.

Mr. Gavitt was formerly Celluloid's New England representative and has been intimately connected with the plastics field for over 20 years. E. V. Crosby, also well-known figure in the industry and connected with Celluloid for several years succeeds Mr. Gavitt in New England territory.

Back to Chicago

R. H. Trask, for the past 5 years connected with E. F. Drew & Co., Boonton, N. J., in charge of production, has resigned to become affiliated with Arthur C. Trask & Co., (sulfonated and processed oils, stearic acid, red oil, varnish gums, etc.) 4103 S. La Salle st., Chicago.

Employed

J. D. Todd has been appointed director of sales, Ozark Smelting-Sherwin-Williams Co. He was formerly superintendent of company's chemical products and dry color dept. Robert L. Moore, formerly chief chemist, Thermatomic Carbon, is technical director, Marshall Asbestos, Troy, N. Y. John H. Kennedy, for 20 years with Grasselli in N. Y. City, is now assistant to Mechling Bros.' sales manager, R. Y. Puff. C. Carlton Smith is now vice-president, Minnesota Linseed. He continues as secretary. Through the N. Y. City Committee on Unemployment and Relief for Chemists and Chemical Engineers Dr. Arnold Lowan, formerly with Combustion Utilities, has secured Princeton fellowship. Dr. G. S. Stamatoff, recent Columbia Ph. D. has been employed by A. C. Horn Co.*

On Sept. 16 the 1,000,000th visitor entered Merck's Century of Progress exposition. Late Charles L. Robertson, Merck advertising manager for years, responsible for the exhibit was unable to visit it before his death.

*Calco announced Oct. 9. engagement of E. J. Barber, recently with Mutual and previously with Cyanamid.

Traffic

Freight car loadings will be 14.7% above actual loadings in same quarter in '32, according to estimates of 13 Shippers' Regional Advisory Boards. On this basis total will be 4,920,561 cars in 4th quarter compared with 4,290,050 cars actually loaded in last quarter of '32.

Estimated carloadings for 4th quarter of '33, together with actual carloadings for like period in 1932 and percentage of increase and decrease for chemical and allied commodities included in the forecast follow:

	Carloadings		*Estimated*
	Actual	*Estimated*	*Increase*
Commodity	*1932*	*1933*	*Per cent*
Ore and concentrates	52,059	212,213	307.6
Salt	25,414	26,657	4.9
Petrol. and pet. prod.	413,634	432,714	4.6
Fertilizers, all kinds	26,977	30,397	12.7
Chem. & explosives	15,329	17,933	17.0

Rate Changes

N. Y. P. S. C. has approved new freight rates of the Erie on caustic in tanks, minimum weight tank capacity of car but not less than 90,000 lbs. from Niagara Falls and Suspension Bridge to Black Rock, 4.5c, an increase of .5c per 100 lbs. Rate effective Oct. 18.

Commission has also approved increased freight rates of the N. Y. C. (East) on acids, phthalic anhydride, carbon tetrachloride, hydrogen peroxide, sodium cyanide, sodium perborate, sulfur chloride, sulfur dichloride, and trichlorethylene, carloads, various minimum weights, and containers from Black Rock, Buffalo, East Buffalo, Niagara Falls and Suspension Bridge to New York, Brooklyn and vicinity, 27c per 100 lbs., an increase of 2c per 100 lbs., effective Oct. 1.

Also rates of the Erie on anhydrous ammonia, in steel cylinders, carload, minimum weight 30,000 lbs., from Niagara Falls and Suspension Bridge to Rochester, 16c (increase 1.5c) and to Black Rock, Buffalo and East Buffalo, 12.5c (increase 1c) per 100 lbs. effective Oct. 1.

Application of provisions of tariff of emergency charges expired on Sept. 30. Charges resulting from rates shown in items as effective on and after Oct. 1 will not be subject to emergency charges.

Commission has also approved an amendment to tariff of the Railway Express Agency on drugs and dyes from Fonda, Gloversville and Johnstown to Brooklyn, L. I. City, and New York, 85c per 100 lbs., reduction from class rates, effective Sept. 25.

Commission has likewise approved lower freight rates of the Lehigh Valley on sulfate of ammonia, carloads, minimum weight 40,000 lbs., from stations at Corfu to Suspension Bridge, inclusive, to Batavia, 8c per 100 lbs.; reduction from class rates, effective Oct. 7. Commission has also approved new freight rates of the

Lehigh Valley on caustic liquor, in tank-cars, minimum weight tank capacity, but not less than 90,000 lbs., from Niagara Falls to Buffalo 4.5c per 100 lbs.; being a reduction of 1.5c per 100 lbs., effective Oct. 1.

River Competition

I. C. C. conditional authorization was given L. & N. and other southern railroads to establish a reduced rate of 36c per 100 lbs. on carload shipments of soap and related articles from Cincinnati, Louisville, St. Louis and Jeffersonville, Ind., to lower Mississippi River points.

Establishment of the reduced rate was authorized to meet active competition of rates over all-water routes without making commensurate reductions at intermediate points not affected by this competition.

Complaints against freight rates intrastate upon fertilizer compounds will be heard before Virginia State Corporation Commission Oct. 26. Case was started by A. A. C. and other fertilizer manufacturers, and all of the major rail carriers are defendants.

Leather

International Society of Leather Trades' Chemists' conference was held Sept. 17-21 at Amsterdam, in conjunction with the Internationalen Vereins der Leder Industrie Chemiker. Dr. H. R. Kruyt, of Utrecht, spoke on "Colloid Chemistry of Collagen and Gelatin," Prof. J. R. Katz on "X-Ray Spectograph of Albumen with Relation to Gelatin."

Glass

Operations at U. S. Glass's Tiffin, Ohio plant opened Sept. 25 with 500 workers. On Sept. 16 Scohy Sheet Glass resumed operations. East end plant of McBride Glass, Salem, W. Va., has also started up. West Penn Glass has been started at Butler, Pa., by Frank E. Troutman.

Chemical Specialties

Trojan Products & Manufacturing, 3101 S. Wabash Ave., Chicago, a new type of metal cleaner, harmless to hands or clothing, and eliminating scrubbing, pumice, lime, etc . . . General Laboratories, 845 Dickinson st., Madison, Wis., is introducing B-K Powder, a germicide containing chlorine . . . Winthrop Chemical, 170 Varick st., N. Y. City, is bringing out new product, Curtasal, which has the taste of salt but can be used by persons on salt-free diets . . . T. & T. Co., Peekskill, N. Y., is introducing Hand-Klen, new, no-water cleanser, which may also be used as a vanishing cream, shampoo, and shaving cream . . . Marktex Co., 374 Madison ave., N. Y. City, has been incorporated to manufacture indelible ink . . . Carey Salt, Hutchinson, Kan., makers of salts for smoked meats, has tooth powder salt.

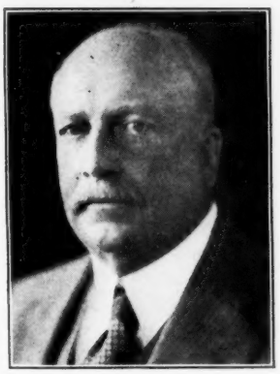
Chemical Fads and Fancies

"The idea of creating life from lifeless chemicals seems fantastic," John Hopkins' Dr. Frank Cuttmacher, declares, "but unless life must be initiated by some ineffable spirit its eventual creation in the laboratory seems not only possible but likely." Which is just about the best way we know of to start a good old fashioned argument, satisfactory to all contestants, for each thinks he has won hands down. And out in Chicago on the eve of the A. C. S.' 86th Meeting, Columbia's Prof. H. C. Sherman states "Plato's ideal of an intellectual aristocracy in which the wisest will rule, is now approaching realization. Page the Brain Trust. Translating, this chemist predicts 10% longer life by scientific diet. Only spinach after all.——— On Sept. 8 William P. Lau, superintendent of the Drug & Chemical Club, N. Y. City, celebrated 25 years of service. He knows all the "400" of the drug and chemical field.———Paraphrasing just a bit—"It can't be long now"—American Distilling (An American Commercial Alcohol division) started gin production last month. Now, bathtubs can be returned to their original purpose. ———George A. Whiting, Standard Phosphate & Acid's president, broke into the winning column with "Lady Susan" on Labor Day, winning the 100-mile Chesapeake Bay cruising race, sponsored by the Gibson Yacht Squadron.———Our idea of marketing supplementary, and in this case complementary, (not free, however) products is satisfied by Zonite with a brand of imported Scotch whiskey which they plan to sell through their regular dealer channels. "Use Zonite and Wives and Sweethearts Will Never Smell Our Whiskey"—would make a grand slogan. ———Sodium lights have been installed in the Antwerp tubes opened Sept. 10 by the Belgian King. Tubes are longer than the N. Y.-N. J. Holland Tube.———Conservative British Faraday Society discussed "Free Radicals" at its Sept. 20th meeting.———Best indication yet that business has turned the corner-over 80 appeared at the last golf meet of the Salesmen's Association Sept. 12. Gathered at the 19th hole—A. A. Wasserschied, Mallinckrodt Chemical's Eastern manager, brought out Dr. F. W. Russe, secretary of the Company, who was East to meet his daughter returning from a long sojourn in Spain. Mallinckrodt's George White celebrated his 40th wedding anniversary at the meet.———Federal Trade Commission is reported ready to investigate the prize racket at the golf tournaments. ———A saddle horse in Jamaica, L. I. named Gogo has been discovered. Photograph is promised for the *Chemical Peddler*. "What I fear," reports Gogo (No. 1) "is which end they will pick of Gogo (No. 2)."———"Ben" Spencer is quite shaky as "Salome"———A sample of what the newspaper headline writers do to A. C. S. broadsides—this from the *N.Y. Sun* "Corn to Lock Fizz in Drink," also "New Tree of Life Found By Chemists"—to the man on the street a chemist begins to look like a revised edition of Dick Merriwell.———Much more dignified and generally instructive was the broadcasting on Sept. 14 over the NBC network of the speeches of Gustav Eggloff; Northwestern's Prof. Lewis (inventor of Lewsite); and Dr. L. V. Redmond on the occasion of the dinner honoring those grand old men of the Society who had attended the A. C. S. Meeting held in conjunction with the Columbian Exposition at Chicago 40 years ago.———One leading company in the industry is reported to have put its official signature to 24 codes owing to the farflung nature of its business.——— One of the Boston Back Bay Cabots does not like the NRA and said so recently in no uncertain terms. He is Philip Cabot, professor of public utility management at Harvard.———"Gossip" column of the *Wall St. Journal* reports switching from Freeport Texas to Texas Gulf Sulphur in the past month. Both companies are showing substantial increases in business. ———A "wag" has remarked that when Cyanamid brought Mackay down from G. E. Labs. to be director of research they wanted to buy a piece of the "House of Magic" after hearing it on the "Air." ———*Weekly Naval Stores Review* printed a supplement on Sept. 16 on paper made of slash pine in Dr. Herty's Savannah laboratory. Casual inspection of the paper seems to indicate good newspaper stock.———Sir Harry McGowan and a group of I.C.I. officials left England Sept. 7 for China and Japan.———One hundred per cent. reppresentation was claimed for the NRA code of the viscose extrusion industry—the only code yet presented to Washington to do so. There are only 4 producers and all signed. Du Pont Cellophane on the 1 hand sells 80% and the Celon Co. but a mere 1%, yet they did not find it difficult to agree on industry terms.———We understand that 1 of the large dye and intermediate producers (part of one of the large chemical combinations that has expanded in recent years) is about ready to announce a big plant building program. ———P. Val. Kolbe, until the Monsanto merger, chief executive of the Providence subsidiary of Swann, spent last summer in Colorado, and has recently been visiting in Chicago and N. Y. City.———

Heavy Chemicals

Mutual Elects

Completing 23 years as president of Mutual Chemical (World's largest bichromate producer) and more than 50 years of intimate contact with chemical industry Frederick W. White laid down the reins Sept. 21 to assume less strenuous duties as chairman of the board, a newly created position. Mr. White, for several decades a commanding figure in the chemical field, is typical of the rugged individualists who pioneered in American chemical supremacy. Like Queeny and unlike either Nichols or Dow he is a "chemical merchant"—leaving to others the solution of technical problems. Mr. White's earlier connection was with the then well-known Peters, White & Co., dealers and importers of industrial chemicals. Associated with him were his brother, the late Summer W. White and the late William R. Peters (at one time president, Royal Baking Powder). In 1908 he pioneered amalgamation of 3 bichromate producers, forming Mutual Chemical. As the importer became less important in the chemical field Peters, White declined, and Mr. White devoted his entire time to Mutual. One of the most important undertakings of his presidency was entrance into the chrome ore mining field, giving control over basic raw material. Mr. White plans to spend his leisure at his Kings' Point Estate, on Little Neck Bay on the North Shore of Long Island. He is perhaps the industry's best known yachtsman and usually commutes via the Sound throughout the summer months.



Now Chairman Fred. W. White
"After 50 years I deserve a little relaxation"

Successor is Dr. Herbert H. Kaufman, former vice-president and general manager of Mutual since its formation. Present Jersey City Works of Mutual was a plant owned by one of the companies joining the amalgamation and Dr. Kaufman was at its head. He is one of the outstanding technologists of the country. In the past few years he has devoted most of his time, however, to the business aspects of the bichromate industry. Thomas M. Peters, son of William R. Peters, on the board of directors since the death of his father, has been elected vice-president to fill Dr. Kaufman's vacancy.

Now Pres. Herbert H. Kaufman
An outstanding technologist—dislikes publicity

The bichromate industry is enjoying critical competition. For several years prior to 1931 producers were Mutual Chemical and Natural Products Refining, but in that year Standard Chromate entered the industry. Battle began in which the price of sodium bichromate rapidly declined over 20%. Within the past few months, however, tonnages moving into both dry-colors and tanning have increased considerably and spot price has been successively advanced.* Better demand, linked with higher ore and other raw material costs, point to a strong possibility of higher contract prices for 1934. Usually contract prices are announced early in October and at least 85% or more of the total tonnage is sold on a year to year contract basis.

Important Price Changes
ADVANCED

	Sept. 30	Aug. 31
Alum, potash chrome	$0.06½	$0.05
Ammoniac, sal	5.00	4.50
Glycerine, Dynamite	.09½	.09
Saponification	.07½	.06¼
Paradichlorbenzene	.16	.15
Potash titanium oxalate	.32	.29
Sodium silicofluoride	.05	.04½
Sodium Stannate	.32	.31
Tin, crystals	.36½	.35½
tetrachloride	.24⅛	.23

Philippine Chrome Ore?

Benguet Consolidated Mining Co., largest Philippine mining concern, signed a contract Sept. 9 for the exploitation of extensive chromium deposits in the Province of Ambos Camarines and is planning an expenditure of $125,000. These are declared to be the only commercial chromium deposits under the American flag, although army reservations in the Province of Zambales presumably are rich in chromite ores.†

Philippines are in the midst of a great boom in mining stock.

Disappointing

September tonnage was disappointing. Reasons advanced are: hesitancy of buyers to build inventories further; curtailment in the basic industries (automotive, steel, etc.); and finally a strike epidemic, most virulent in the Paterson district. Despite the month's poor showing prices remained firm, due largely to the fact that in many instances raw material costs are much higher. When comparison is made with September, '32 a more optimistic picture is presented for tonnages the past month exceeded those of a year ago by a wide margin. They were, in most items, not as satisfactory as June, July, or even August. The alkalies and chlorine proved the exception. Producers report satisfactory volume.‡

Fewer price changes were made in September than for any of the past 3 months. Bullish tone in tin (market closed September at the year's high) was responsible for generally higher quotations on tin crystals, tetrachloride and stannate. Glycerine has definitely turned stronger and although c.p. quotations have not been changed dynamite and saponification grades were much higher.

The dollar continued to decline most of the month. This acted as a buffer against possible lowering of quotations on imported items. Futher, higher prices for imported raw materials were responsible for firmness in the domestic items produced from them.

With the contract season at hand much uncertainty exists as to possibilities. Practically everyone is agreed that higher prices are inevitable. But to what extent? Will the more stable items, like caustic, ash, sulfuric, muriatic, be quoted higher? It is practically certain that no major contract campaign will get under way until the Chemical Alliance and allied codes are finally approved and producers know at least what their labor costs are to be. Signs point to an even later contract season than that of '32.

It is known, of course, that bichromate producers are restive under existing contract prices. Spot quotations have been advancing steadily and would seem to indicate pretty definitely a higher '34 schedule. Possibilities in alkalies are several. Ash is naturally firmer than caustic. Prices generally were better throughout '33 than they were in '32. Whether producers can restore '31 levels

*On Oct. 1 spot price of soda bichromate was advanced to 5¾-6¼c.

†Report of Philippine commercial ore is viewed with extreme skepticism in chemical circles. With sufficient ore of high chromium content (45-50% Cr) available in New Caledonia, Africa, India and Russia for normal needs for many years, outlook is thought to be discouraging for new developments. Chrome ore reviewed (*Chemical Markets*: May '32, p. 453).

‡August, polished plate glass—11,326,618 sq. ft., July, 11,350,393 sq. ft.

once more depends upon the extent business improves; whether the country is led by the Administration further along the path of credit rather than currency inflation, or whether it resorts to a mixture of both. Currency inflation would, of course, lead to much higher prices immediately, much higher than they will be likely to reach through a strict adherence to a credit inflation policy exclusively. The situation on the contract question is likely to be a lot clearer both for the buyer and the seller on Nov. 1 than it is as September closes.

In Miniature

Texas Gulf Sulphur's Century of Progress exhibit—a complete mining operation in miniature—is attracting widespread interest.

Initial Dividend

Arthur Barba, Jefferson Lake Oil, president, announced Sept. 14 company will pay a dividend of 70c per share to preferred stockholders Oct. 16. Dividends will be paid to stockholders of record Oct. 1. Dividend is first to be paid and represents a back dividend due in 1931. A total of $130,000 will be distributed to stockholders.

Caustic soda plant is to be erected in Brazil, using German equipment. During 1932 importations totaled 18,130 metric tons of which U. S. supplied 25%.

Metallics & Non-Metallics is a new Saskatchewan producer of sodium sulfate by, it is reported, a new process.

Coal Tar Chemicals

Price Stability

Few prices moved in September. Cresylic (both grades) went higher, due largely to the adverse currency rate. The same reason is assigned for the increase in imported crude naphthalene. Toluol continued scarce and in good demand. Benzol shipments were also heavy. Demand for intermediates was reported as good, with many consumers inquiring for 1934 prices. Unsettled labor conditions in textiles and leather had a slight effect on dye production. Decline in steel activity did not affect the situation, but several of the coking companies were experiencing labor troubles which curtailed production.

Important Price Changes
ADVANCED

	Sept. 30	Aug. 31
Acid cresylic 95%	$0.44	$0.42
97-99%	.47	.45
Naphthalene, crude, imp.	1.81	1.75

Coking coal charged in by-product ovens in August amounted to 4,253,034 tons, showing an increase of 4.4% over July which amounted to 4,057,375 tons and August last year totaled 2,126,700 tons. For 1st 8 months total was 24,077,108 tons as against 20,732,000 tons for corresponding period a year ago. Benzol production amounted to 7,157,000 gals. as compared with 6,839,000 gals. in July (4.6% increase) and 3,226,000 gals. in August last year. Output to end of August amounted to 38,831,000 gals. as compared with 32,828,000 gals. in same period 1932.

Output of tar in August amounted to 38,962,312 gals. as against 37,327,850 gals. in July and 19,565,640 gals. in August last year. To the end of August output reached 26,484,818 gals. as compared with 22,805,200 gals. in similar period last year. Production of light oils in August was placed at 12,959,243 gals. as compared with 12,415,567 gals. in July and 6,407,702 gals. in August, 1932. A total of 73,675,950 gals. was produced in 1st 8 months of 1933 as compared with 63,439,920 gals. in corresponding period last year. Output of sulfate of ammonia, or its equivalent, in August amounted to 49,698 tons as against 47,613 tons in July and 24,957 tons in August, 1932. For calendar year to Aug. 31 total was 282,545 tons as against 243,290 tons in same period of the preceding year. Stocks at by-product plants increased slightly, from 2,846,408 tons at the end of July to 2,915,388 tons at the close of August.

British Coal Tar

Great Britain coal tar distilled in 1932 totaled 1,422,000 tons, of which 654,200 tons was for production of pitch. Of the total coal tar distilled, 957,600 tons came from gas works, 447,400 tons from coke ovens and 17,800 tons from other works.

New British plant near Rotherham will turn out 5,000 gals. of benzol daily.

A £7,000,000 hydrogenation plant (gasoline from coal) is projected in British South Africa provided Government guaranties continuance of present import tax of 6 pence. Plant will be located at Vereeniging or Witbank. Coastal belt will be left to imported gasoline, it is planned.

Benzol Statistics

U. S. benzol production, estimated by Bureau of Mines from production of coke at by-product ovens known to recover benzol, totaled 24,834,424 gals. in 1st 6 months of 1933 compared with 26,253,000 gals in corresponding period of 1932.

Coal Tar Imports

U. S. imports of synthetic dyes in August amounted to 594,394 lbs., valued at $682,893. Month's imports were 61% larger in volume than those in August, 1932, and brought total for 8 months of this year to 3,031,425 lbs., valued at $3,160,141, an increase of 29% in volume and 52% in value in comparison with last year.

Imports of synthetic aromatic chemicals in August, while substantially larger than those in July, were only 53% as large as those in August, 1932, and their value was much lower. Imports of color lakes remained small. Imports of other finished coaltar products and of intermediates showed a marked increase in volume and a still larger increase in value in comparison with August, 1932.

Imports of Synthetic Dyes

	1933	
	Pounds	*Value*
Jan.	314,878	$311,640
Feb.	365,144	369,829
March	267,890	257,626
April	232,741	229,078
May	360,490	352,111
June	382,452	389,174
July	513,436	567,790
Aug.	594,394	682,893
Totals	3,031,425	$3,160,141

	1932	
	Pounds	*Value*
Jan.	297,266	$259,558
Feb.	429,298	367,154
March	482,545	410,865
April	300,144	259,425
May	206,225	203,483
June	117,792	109,208
July	151,089	138,136
Aug.	369,327	329,810
Totals	2,353,686	$2,077,639

Countries of Origin of Dye Imports

	Percentages—August	
	1933	*1932*
Germany	51.19	65.33
Switzerland	46.38	32.32
England	2.22	1.99
All other	.21	.36

Leading Dyes

(A total of 607 dyestuffs was imported)

	Pounds
Vat golden yellow GK double paste (single strength)	26,000
Eriochrome black T	25,000
Trisulphon brown BP con	23,765
Ciba brown G paste	12,522
Vat printing black B paste	11,000
Brilliant indigo 4G paste	10,098

Customs Rulings

Importations of drums filled with a commercial product are considered as 2 articles for customs purpose, and marking of containers to indicate country of origin of both drums and contents is required under Section 304, of the tariff, (decision by Justice Genevieve Cline in the Customs Court). Failure to mark drums with respect to either or both warrants assessment of 10% extra duty fixed by law, she holds. Issue arose through protest of Lloyd Bros. Pharmacist, Inc., Cincinnati, against the levy imposed on iron drums containing glycerin. Marking on the drums showed origin of the contents and Justice Cline finds that separate tariff classification for them at 25% regular duty makes them also subject to marking as to their origin.

Fine Chemicals

Citric—Tartaric Acids

According to report on the Italian chemical industry in 1932, by Dr. Bosnini, General Secretary of the Federazione Nazionale Fascista Industrie Chimiche ed Azni ("Die Chemische Industrie," July 8, 1933), both the citric and tartaric-acid industries experienced a most difficult year. Output of calcium citrate amounted only to 1,940 tons, after the 5,500 tons of 1931, the 10,700 tons of 1930, and the 3,800 tons of 1929. For tartaric acid, Italian production figures were: 1932, 3,000 tons; 1931, 4,000 tons; 1930, 4,800 tons; and 1929, 6,100 tons. For citric acid corresponding figures were: 1,080 tons, 2,200 tons, 3,800 tons, and 3,700 tons respectively. In cream of tartar, Italian output in 1932 was 1,100 tons, as compared with the 1,400 tons of 1931 and 1930, and the 1,700 tons of 1929.

Of 5 Italian tartaric-acid factories, only 2 were in operation last year, and neither of these worked full time.* At the end of 1932, citric-acid producers' cartel was dissolved, but a new organization was formed in its stead. Efforts made in 1932 to form a cartel of citric and tartaric-acid manufacturers in Italy, Germany, France, the United Kingdom, Spain, Belgium, and Czecho-Slovakia did not prove successful.

Currency Fluctuation

Raw material costs, specially those items of foreign origin, continued to fluctuate rather widely in September and to exert heavy influence on prices of finished materials. Outstanding was the wide break in crude iodine prices (amounting to about 40%). Practically all of the iodine salts were sharply lower. Large surplus stocks here, in Europe, and in Chile, plus growing competition from domestic producers are the reasons assigned for the sudden move.

Early in the month the remaining bismuth salts, not marked up as a result of the metal rise from 90c to $1.20, were brought into line. Important bromides were advanced Sept. 14. Higher manufacturing costs were given as the reason for the higher prices for U. S. P. sodium benzoate and the acid. On Sept. 18 U. S. P. Rochelle Salt and Seidlitz Mixture increases were announced. All ether quotations were advanced Sept. 12. Silver nitrate, reflecting the improvement in the metal, closed at 29 5/8c. A $3 net gain in mercury for the month did not result in any immediate change in the mercurials.

The sharp rise in exchange rates, specially the favorable position of the Dutch guilder, brought about a thorough upward revision of quinine and salts. Prices generally are sensitive to the dollar fluctuation abroad. In the past month these day to day fluctuations have been particularly pronounced and largely on the downward side for the dollar. Dollars continued to buy less merchandise abroad.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Acid benzoic, U. S. P.	$0.53	$0.48
Ammonium bromide, U. S. P.	.39	.35
Bismuth, citrate U.S.P. VIII	2.60	2.55
Nitrate, U.S.P.	1.20	1.10
Oxychloride, U.S.P.	2.95	2.60
Subbenzoate, U.S.P.	3.25	3.10
Trioxide	3.45	3.23
Calcium lactate, U.S.P.	.29	.25
Ether, anesthesia	.24	.22
Menthol	2.50	2.25
Potassium bromide, U.S.P.	.35	.31
Rochelle Salt, U.S.P.	.12½	.11½
Seidlitz Mixture	.10¾	.10
Silver nitrate	.29⅝	.26¼
Sodium benzoate, U.S.P.	.45	.40
Sodium bromide	.35	.31
Strontium bromide, U.S.P.	.50	.46
DECLINED		
Iodine, crude	15s 1d	£1 5s
Iodine, resubl.	$2.10	$3.35
Iodoform	4.25	5.15
Potassium iodide	2.00	2.70
Sodium iodide	2.75	3.50

Glycerine and Soap

Glycerin imported into Cuba must be officially analyzed to determine proper tariff classification. Importers are required to submit a sample to the government's laboratory.

"Chipso"—A Correction

September CHEMICAL MARKETS reported (p. 257) "P. & G. must abandon use of 'Chipso' trade-mark. J. I. Prescott Co., Passaic, N. J., was the complainant." No such ruling has been made. Complaint will be heard Oct. 18, according to latest advices.

Southern Cotton Oil began season with 90 employees. NRA is responsible for 8 instead of 12 hour shifts.

Solvents

Acetone Advanced

Quite naturally the sudden announcement of a 1c advance in the tank price of acetone and a 1½c advance in carlot drums was easily the outstanding feature of the month's solvent news. In certain quarters this action was interpreted as meaning that the highly competitive situation in the solvent field was beginning to change and that the immediate outlook is now for firmer prices and possibly higher quotations within a reasonably short time. Rumors were heard that butyl alcohol prices might be revised upward within the next few weeks.

With the automotive industry enjoying 4 months of better than 200,000 units in each 30 day period the solvent stocks have been appreciably reduced and the situation has taken on a much firmer appearance. Even ethyl acetate has exhibited stronger tendencies.

In the alcohol field approach of the end of prohibition, with its certain heavy demand for large grain alcohol stocks, has had a very encouraging effect on alcohol producers. They are very firm in their price attitude on all formulas. In addition, nearness of the anti-freeze business acts as a further price stabilizer, despite the fact that further competition for anti-freeze business has now been added by the largest oil company with a 3,000,000 gal. production of mixed isopropyl and methanol, in addition to glycerine, methanol, ethylene glycol and various trade-marked mixtures of these. It is understood, however, that most of the isopropyl-methanol has been contracted for. While the glycerine producers have not altered the refined grade as yet, other grades have been advanced and the outlook is said to be quite favorable to higher quotations within a short time. Anti-freeze bookings to date have been in satisfactory volume.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Acetone, tanks	$0.09	$0.08
Carlots	.10	.08½
L. C. L.	.10½	.09½
Cleaners' Naphthas, Group 3, tanks	.06⅜	.05½
Lacquer Diluents, Group 3, tanks	.07⅜	06½
Petroleum Thinners, Group 3, tanks	.04⅞	.04¼
Rubber Solvents, Group 3, tanks	.06⅛	.05½
Stoddard Solvent, Group 3, tanks	.05⅝	.05
V.M.&P Naphthas Group, 3 tanks	.05⅞	.05¼

Petroleum solvents in group 3 area all registered definite price gains in 30 day period. This action was directly traceable to Government's entrance into oil industry to control production, stabilize prices and to end chaotic conditions ruining the field for many months.† With the Oil Industry Code signed the Government's powers are now certain. Unex-

*Oct. 2 tartaric (dom.) was advanced 1c; gran. and powd. in bbls., 25c a lb.; crystals, ½c higher. Cream of tartar was advanced to 17½c (5 bbls.or more), an advance of ½c.

†August crude oil production, anticipating restriction under code, reached 85,239,000 bbls. as against 84,387,000 in July. August production was highest month since 1929. Oil code, in effect Sept. 8, was expected to cut production by 300,000 bbls. a day. Stocks Aug. 31, 356,434,000 bbls., a gain of 5,510,000 bbls. in the month. Daily average production for week ended Sept. 30 was 2,446,850 bbls., reduction of 40,150, bbls., from preceding week's average of 2,487,000. Allowable in period was 2,409,700. Allowable for October is 2,338,500. Actual production for 4 weeks ended Sept. 30 was 2,557,300 and production at this time a year ago was 2,172,000 American Petroleum. Institute estimates still operation at 70%.

pectedly as the month closed a 1/8c decline was made in Group 3 tank prices, but with crude again advanced immediately after this reduction was placed in effect it is not unlikely, according to those close to the market, that not only will this 1/8c be regained, but that further advances are likely.

In the Midwestern section tankwagon prices were advanced Sept. 12. East Coast refineries did not change quotations of either tanks or wagon deliveries. Posted wagon prices closed the month as follows:

Mid West

	Cleaners' naphtha	*Stoddard solvent*	*Petroleum thinner*	*V.& M.P. naphtha*
Chicago	15.0	15.0	13.9	15.9
Decatur	17.6	17.6	16.3	17.8
Des Moines	17.7	15.6	17.3	18.8
Milwaukee	21.8	18.5	19.5	21.0
Minneapolis	22.1	17.8	19.8	21.3
St. Paul	22.1	17.8	19.8	21.3
St. Louis	17.0	14.0	14.7	16.2

East & South

Boston	...	...	...	14.0
Newark	11.5	12.0	12.0	11.5
New York	11.5	12.0	...	11.5
New Orleans	11.0	11.0	...	...
Phila.	...	14.0	...	...

The prices shown for Milwaukee included 4c. per gal. State tax and those at Minneapolis and St. Paul 3c. per gal. State tax.

Indicted

Dunbar Molasses, N. Y. City, its New Orleans subsidiary, 4 former executives of the New York concern and others were indicted by a Federal grand jury in New Orleans Sept. 15 on charges of conspiracy to violate the National Tariff Act in connection with molasses shipments.

Edmond E. Talbot, U. S. District Attorney, charged the government had been defrauded of more than $500,000 by illegal operations of the concerns in importation and exportation of blackstrap molasses from the early part of April, 1926, through Aug. 3, 1933.

N. Y. officials named in the indictment were Maurice Levin, Henry C. Kaplan, Irwin Stern and I. J. Seskus.

Alcohol News

U. S. I. has acquired additional shares of Penn-Maryland, Inc., by issuance of 7,967 shares of common stock in payment, according to supplementary notice to the Stock Exchange. Penn-Maryland, Inc., owns all the stock of Penn-Maryland Corp. which owns or leases plants for the production of alcoholic beverages. Earlier this year U. S. I. issued 9,425 shares of stock for an interest in Penn-Maryland.

U. S. I. has been operating its Peoria plant for several weeks making grain alcohol for gin. Penn-Maryland has been granted a license for gin. License covers output of Peoria plant as well as Fleischman Distilling plant producing gin alcohol for Penn-Maryland.

Rossville Alcohol has received $1,215,000 in cash for its Carthage, Ohio, distillery recently sold to Penn-Maryland, jointly owned subsidiary by U. S. I. and National Distillers.

Rossville is starting whiskey production at Lawrenceburg, Ind., and plans to start production of gin and rum at Newark, N. J., within a month.

Remaining 15,000 shares of $25 par preferred stock have been called for retirement. Including 30,000 shares of Commercial Solvents stock now held in the treasury at its market value Rossville now has total cash and securities of nearly $4,000,000. There are 203,000 shares of common outstanding.

Blackstrap Agreement

Blackstrap molasses marketing agreement, establishing quotas for producing areas under certain conditions, has been drafted by interests that negotiated the Government revision of the basic sugar marketing agreement, which still lacks the industry's approval.

Quota provisions of the measure, it is understood, are to be inoperative if the delivered price of molasses is above 7c a gal. No quotas are provided for Louisiana and Florida and, in the event prices remain below that figure, allotments for the domestic market or other areas are to be based upon quotas in the original sugar marketing agreement.

Allotments are understood to be based upon usual realization of 50 gals. of blackstrap from each ton of raw sugar that is milled. This would give Cuba a quota of around 85,000,000 gals.; Puerto Rico, 50,000,000; Hawaii, 50,000,000, and the Philippine Islands 50,000,000.

British Annual Report for 1932 of the Chief Inspector of Factories (medical section report) gives special attention to use of trichlorethylene and states that with ordinary precautions material is safe. Copies of report are obtainable from H. M. Stationary Office, London, 2s net.

Gums, Waxes, Shellac

Important Gum Price Changes
ADVANCED

	Sept. 30	Aug. 31
Gum, Asfetida, lump	$0.17	$0.16
powdered	.33	.31
Camphor, slabs	.49	.47
Copal Congo, dark amber	.09¼	.08
East India, chips	.05½	.05
Elemi, No. 1	.11¾	.10
No. 2	.11¼	.09½
Manila, Loba A	.13	.10½
Sandarac, spot	.40	.35

Sandarac Features Gums

Volume of trading increased steadily each week in September. Prices fluctuated 1st upward on the persistent weakness of the dollar caused by the belief that currency inflation was just "around the corner' and then later showed some weakness when the Administration appeared to be giving more consideration to credit inflation. In the main, however, most of the net gains for the gums for the month were on the upward side. It is felt that any further definite improvement will result immediately in higher spot prices as stocks here are not large at the moment. Largely for this reason sandarac exhibited specially strong price tendencies. The competitive position of arabic remained unaltered.

Improvement in consumer demand for the waxes also marked the past trading period. Starting very modestly after the Labor Holiday each week saw a broader inquiry. The dollar weakness in terms of foreign currencies served to strengthen the price structure. Quotations in primary centers on most items were firm and factors in these various centers were unwilling, in most instances, to quote futures without considering mark-up as protection against possible currency inflation. Primary centers are not particularly anxious to push shipments, hoping for higher prices later. This situation is compelling dealers in this country to carry rather small stocks which will quite likely prove insufficient in the event business suddenly spurts, leading tc temporary but sizable price rises.

In the 2nd week of the month Carnauba declined due to lack of demand. In the following week part of this decline was

Shellac Prices, Weekly High - Low for London, Calcutta, N. Y. City

	London		*U. S. cents*		*Calcutta*	*N. Y. City*					*Shellac Varnish*					
	Oct.† High-Low	*Dec.† High-Low*	*Oct.§*	*Dec.§*	*T. N. C. & F. N. Y. Sept.‡*	*Bone Dry 10 bbls.*	*Bone Dry 5-9 bbls.*	*Bone Dry 1-4 bbls.*	*T. N.*	*Super-fine*	*Garnet*	*Orange* 5 lb. cut*	*Orange* 4½ lb. cut*	*White 4 lb. cut*	*White 5 lb. cut*	*White 4½ lb. cut*	*White 4 lb. cut*
Week Ending																	
Aug. 31	56½s	57½s	12.2	12.4	.10¾	.24	.25	.26	.15-.15¾	.16-.16¾	.17-.18	1.00	.95	.90	1.25	1.20	1.15
Sept. 8	56s 6d	57s 6d	11.8	11.3	10¾—11¼	.24	.25	.26	.15-.15¾	.16-.16¾	.17-.18	1.00	.95	.90	1.25	1.20	1.15
Sept. 15	53s 56s 6d— 51s 6d	-52s 6d 57s 6d	12.2	12.3	.10¾	.24	.25	.26	.13-.13¼	.14-.14¾	.17-.18	1.00	.95	.95	1.25	1.20	1.15
Sept. 22	56s 6d— 56s	57s 6d 57s	12.1	12.3	.10¾	.24	.25	.26	.13-.13¾	.14-.14¾	.17-.18	1.00	.95	.90	1.25	1.20	1.15
Sept. 29	56s— 54s 6d	57s 55s 6d	12.1	12.3	.10¼	.24	.25	.26	.13-.13¾	.14-.14¾	.17-.18	1.00	.95	.90	1.25	1.20	1.15

*per gal. †per cwt. ‡Subject to exchange correction (London). Sterling exchange at $4.88. §Closing price each week.

recovered. Carnauba dealers were slightly upset when it appeared that either brazilian exporters were holding back

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Bayberry	$0.15	$0.14
Candellila	.09½	.09
Montan	.08¾	.08
DECLINED		
Carnauba, No. 1 yellow	$0.28	$0.29
No. 2, yellow	.27	.28
No. 2 N. C.	.16	.16½
No. 3, N. C.	.13	.14¼
No. 3, chalky	.13	.13½
Japan	.06¾	.07
Spermaceti, blocks	.18	.20
cakes	.19	.21

scheduled shipments (due possibly to unsold stocks remaining there being small or that the Brazilian Government was again planning valorization of Carnauba). African yellow beeswax, Japan and spermaceti were off slightly, mainly due to rather limited demand from consumers.

Shellac Works Lower

Despite several strikes in large furniture plants consumption in September improved from the low reached as August closed. In the 2nd week a 1c reduction was made in T. N. and Superfine, due to lower replacement costs becoming available in primary centers. No alterations were made in Bonedry or shellac varnish quotations. Factors here reported that spot business was fair, but that consumers were not favorably disposed to make future commitments of any size. Contract buyers were reported by bleachers to be taking tenders in satisfactory volume. In the primary centers prices fluctuated within narrow limits as the dollar quotation alternately rose and fell. Interest centered largely on the policy to be taken when present contracts are ended.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Albumin, egg, edible	$0.83	$0.81
Myrobalans J1	32.00	31.50
Quebracho, 35% lig.	.02⅜	.02
Solid 63%	.03⅜	.03
Sumac, Sicilian, ground, chips	67.00	62.50
Wattle bark	32.00	30.00
DECLINED		
Dextrine, White	$3.57	$3.59
Canary	3.62	3.64
Gum	3.87	3.89
Divi divi	28.00	30.00
Valania beards	40.00	42.00

Gum Importers Golf

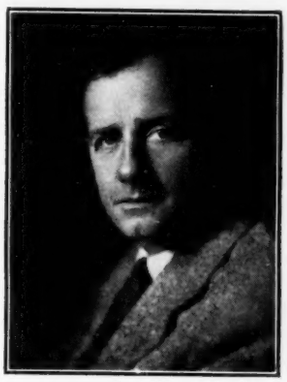
Quarterly meeting and annual outing of American Gum Importers Association was held, Sept. 12, at Crescent-Hamilton Club, Huntington, L. I. Golf prizes were won by Charles F. Walden, Thurston & Braidich, A. Schwarbacher, and E. Weiland, Cyanamid, W. A. Patterson, of G. W. S. Patterson & Co., S. Stroock and A. J. Wittenberg, of Stroock & Wittenberg, H. E. Hendrickson, S. Winterbourne Co., and J. T. Gillespie, Gillespie-Rogers-Pyatt.

*Coming paint conventions (see Coming Events p. 384) will consider suggested merger of associations.

Paints, Lacquers and Varnish

Opposition

On Sept. 26 Ernest T. Trigg and his paint code committee faced Deputy Administrator Williams and his NRA assistants at the formal code hearing and heard



Frank G. Breyer voices certain lacquer interests' objections to code

their labors attacked by Frank G. Breyer (Singmaster & Breyer) representing newly formed Lacquer Manufacturers' Association. Paint code (most detailed one to reach NRA hands) must eliminate controversal "Merit Clause" General Williams announced. Consumers' advisor reported that he would oppose many of the price fixing and price maintenance clauses. Foster D. Snell, representing producers of waxes and polishes, announced that producers of these items preferred to come under chemical specialty division of the Chemical Alliance code rather than in the paint code, although products are usually merchandised through same channels. Stanley J. Quinn, speaking for Valentine Co., Detroit Graphite and Conferro Paint & Varnish, opposed rule against consignments. Free deals (another long debated industry question) came in for lengthy debate by those both in favor of the practice and those against.

Objections to exclusion of lacquer thinners from cost formula were voiced by A. A. Eisenberg, Southern Lacquer, Baltimore, and Frank G. Breyer. Former described exemption as a legalized form of racketeering, explaining that many lacquer manufacturers attempt to make users believe that there is something mysterious about their brand of thinner and use various underselling methods in order to secure a monopoly in the solvents business.

Mr. Breyer's statement in part read as follows:

"The only safe and logical policy for lacquer manufacturers is to bring *all* raw materials purveyors within the lacquer code when they sell lacquer or lacquer ingredients to lacquer consumers. The new amendment to Article II "Definitions" of "The Industry" if it does not now effect this should be further amended until it does effectively insure that raw materials producers shall have no advantage over lacquer manufacturers proper when offering their goods to the lacquer manufacturers' customer.

Consumer adviser will file formal protest on: Standard terms of cash discount; rule against future datings; prohibition on guarantees against price declines or guarantees of service of paint; rule on packaging differentials and cost ascertainment; rule against underselling claims; schedule limiting sizes and colors to simplification program; rule against exchange of goods in the dealers' hands; schedule of package differential additions and deductions.

Hearing, lasting but 1 day, leaves code in NRA Administration hands. Final revisions will be worked out between General Williams and the Paint Code Committee.

Young But Capable

Thomas J. McFadden, acting manager since the recent death of George V. Horgan, was the unanimous choice of a joint committee of the N. P. O. & V. Association and the A. P. & V. Mfrs. Association. Committee: President S. R. Matlack, N. P. O. & V. Association, President J. F. Kurfees, A. P. & V. Mfrs. Association, and Ernest T. Trigg, chairman, Educational Bureau.*

Second Quarter Lacquer Sales

Lacquer sales in 2nd quarter were 5,935,608 gals., with a value of $8,044,749, against 3,905,846 gals., valued at $5,323,315, in preceding quarter, and 4,475,293 gals., valued at $6,867,544, in second quarter of 1932:

	Total sales		*Finished lacquer*		*Lacquer thinners*		*Dopes**	
1933	*Gallons*	*Dollars*	*Gallons*	*Dollars*	*Gallons*	*Dollars*	*Gallons*	*Dollars*
First quarter†	3,905,846	5,323,315	1,916,350	3,668,615	1,765,148	1,401,624	224,348	253,076
Second quar.‡	5,935,608	8,044,749	2,938,643	5,561,381	2,708,268	2,152,168	288,697	331,200
1932								
First quarter.	4,666,420	6,947,508	2,249,069	4,692,055	2,161,317	1,913,937	256,034	341,516
Second quar..	4,475,293	6,867,544	2,337,612	4,823,513	1,968,189	1,796,301	169,492	247,730
Third quarter	3,578,390	5,392,948	1,778,305	3,593,977	1,601,875	1,515,330	198,210	273,641
Fourth quart.	3,532,718	5,140,226	1,836,432	3,524,739	1,449,002	1,341,175	197,284	274,312
Totals, year	16,252,821	24,338,226	8,201,418	16,634,284	7,230,383	6,566,743	821,020	1,137,199
1931								
First quarter.	5,622,337	9,504,887	2,835,390	6,524,744	2,565,008	2,602,506	221,939	377,637
Second quar..	6,712,289	10,966,421	3,265,744	7,399,231	3,153,427	3,038,561	293,118	528,629

*Does not include base solutions used in the manufacture of lacquers. †Revised. ‡Preliminary.

Mr. McFadden has been connected with the joint Washington offices of the Associations for several years, and acted as Mr. Horgan's assistant. Stepping in at a critical time (Mr. Horgan's sudden death occurred May 25 in the trying period of code formation) Thomas J. McFadden so impressed prominent paint executives that they were glad to avail themselves of his services in a permanent way.

Fall Buying

Paint, varnish and lacquer demand increased in September over August. Yet the seasonal improvement was not as large as had been hoped for. The problem of completing the paint code and the public hearing (Sept. 26) drafted many of the industry's leading executives away from their desks. Total building operations in August exceeded July and indications point to the strong possibility that September improved upon August figures. N. Y. City August permits totaled $5,249,530, a rise of 16.3% over July and 18% over August last year. For 214 cities outside of N. Y., building expenditures for August aggregated $27,173,438. This was a gain of 8.8% over the previous month and of 17.5% over August 1932. Nevertheless the totals are yet far from being specially impressive. The program of government assistance (in the form of public works program; loans to the railroads for materials, etc.) has not reached the stage yet where the paint industry can feel any tangible results.*

Price changes were few in September. Carbon black producers are awaiting their code approval before taking up 1934 contract prices. They have intimated quite strongly that there is practically no doubt that the quotations will be higher. Production costs were higher than selling prices even before the necessity of higher labor costs entered the picture and no alternative remains but to bring the latter up to a profitable level.

Whether or not the entire detailed section of the paint code dealing with sizes, prices, differentials, etc. will find approval before Deputy Administrator Williams and his NRA aids remains unanswered as yet, but is is quite evident that tremendous opposition exists in certain circles to any form of specific price fixing through the medium of a code.

*August paint, etc., sales $20,620,811 compared with $16,032,441 in '32; Lacquer $1,568,774 against $793,932.

Metal pigments passed through a quiet period. Both zinc and lead fluctuated within very narrow limits (see Metals & Alloys for prices). Late in the 3rd week quotations on foreign lithopone were suspended because of the currency exchange rate. This condition was also responsible for firm prices for the varnish gums, specially the copals. Casein prices ended the month slightly below the close Aug. 31.

Paint manufacturers are looking forward to a busy October and at least part of November. It is expected that automotive production will soon show the usual seasonal decline, anticipating next season's models, which will tend, of course, to show lacquer up temporarily.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Cadmium selenide	$2.50	$2.00
Glue, hide, high	.23	.21
medium	.19	.17
Vermilion, English	1.37	1.35
DECLINED		
Casein, dom	$0.14	$0.14¾
Argentine	.13¾	14

New Synthetic Resin

Richardson Co., synthetic plastic material, Cincinnati, has been doing considerable research work on synthetic resin for the paint manufacturing industry and expects presently to be in a position to offer a line of products to the industry.

Flaxseed Crop Sept. 1

	—Condition Aug. 1 (percent.)—			—Bushels—		
	10-year aver., 1921-1930	1932	1933	Harvested 5-year aver. 1926-30	Harvested (Revised) 1932	Estimated 1933
Wis.	83	80	71	104,000	72,000	48,000
Minn.	80	72	49	6,566,000	5,704,000	4,092,000
Iowa	84	75	60	180,000	171,000	147,000
Mo.	81	69	70	15,000	11,000	11,000
N. Dakota	68	34	35	8,032,000	3,720,000	2,083,000
S. Dak.	69	41	15	3,374,000	776,000	97,000
Neb.	83	60	65	99,000	18,000	13,000
Kan.	6.3	6.5	6.0	195,000	299,000	168,000
Mont.	64	42	26	1,367,000	998,000	342,000
Wyo.	74	47	38	78,000	18,000	8,000
U. S.	70.8	47.7	41.6	20,011,000	11,787,000	7,009,000

Flaxseed Prices in Primary Centres

	Minneapolis			Duluth			Winnepeg			Buenos Aires	
Week Ending	Cash	Sept.	Dec.	Cash	Sept.	Dec.	Cash	Oct.	Dec.	1933	1932
Close Aug. 31	....	1.78	1.81¾	....	....	1.81	....	1.40	1.40¼	1.09⅞	.63
Sept. 8	1.86	1.79	1.83	1.87	1.83	1.83½	1.39⅜	1.40¾	1.43¼	1.15	.66⅝
Sept. 15	1.91½	1.84½	1.87½	1.91	1.88½	1.89¼	1.49¼	1.50¼	1.50⅞	1.08½	.70½
Sept. 22	1.91½	1.85¼	1.86½	1.91	1.87½	1.88	1.47½	1.48	1.51½	1.11¾	.68⅝
Sept. 29	1.90	1.82¾	1.84	1.90	1.85	1.84½	1.44⅜	1.44½	1.46¾	1.04½	.67⅞
Close Sept. 30	....	1.82¼	1.83½	....	1.84½	1.83¾	....	1.42½	1.45¼	1.04¼	....
Net Gain for Month	....	+.04¼	+.01¾	....	+.01½	+.02¾	....	+.02½	+.05	—.05⅝	....
Close Sept. 30, 1932	....	....	1.13¾	....	1.15¼	1.14½	....	.76½	.78⅜	....	.67⅞

Domestic Flaxseed Receipts By Weeks

	Sept. 8		Sept. 15		Sept. 22		Sept. 29	
Week Ending	1933	1932	1933	1932	1933	1932	1933	1932
Minneapolis cars	296	321	211	138	126	142	114	166
Duluth cars	103	282	133	361	83	286	61	218
Winnipeg cars	3	6	3	8	3	9	4	26
Totals to date this crops*	1,373	2,752	1,720	3,259	1,932	3,696	2,111	4,105

*From Aug. 1.

Linseed Oil Prices, Minneapolis, London, San Francisco and Chicago

	Minneapolis		London Weekly High-Low*		San Francisco		Chicago		N. Y. City	
Week Ending	Carlots	Tanks	Low	High	Carlots	Tanks	Carlots	Tanks	Carlots	Tanks
Sept. 1	10.1	9.7	19s 9d	20s 3d	10.6	10	10.3	9.7	10.7	10.1
Sept. 8	10.3	9.9	19s 9d	21s 1½d	10.6	10	9.3-9.5	9.7-9.9	10.5	9.9
Sept. 15	10.3	9.9	19s 7½d	20s 6d	10.8	10.2	9.3	9.7	10.5	9.9
Sept. 22	10.5	10.1	19s 4½d	20s	11.0	10.4	10.5-10.7	9.9-10.1	10.5	9.9
Sept. 29	10.5	10.1	19s	19s 7½d	11.0	10.4	10.5-10.7	9.9-10.1	10.3	9.7

*Per cwt.

Minneapolis Linseed Oil and Meal Shipments

	Oil in Pounds		Meal in Pounds	
Week Ending	1933	1932	1933	1932
Sept. 8	1,076,527	1,581,057	968,618	2,615,478
Sept 15	1,529,207	1,808,612	1,245,258	3,582,011
Sept. 22	1,284,134	2,422,755	1,901,680	3,279,560
Sept. 29	1,017,249	1,331,009	1,731,820	3,851,428
Totals to date	5,152,648	7,317,712	6,280,751	14,337,992

Buenos Aires Flaxseed Shipments, Stocks

Week	Exports in Bushels*					Since Jan. 1, 1933*					Since Jan. 1, 1932*					Total*		Visible Supply*	
Ending	U.S.	U. K.	Cont.	Orders	Other	U. S.	U. K.	Cont.	Orders	Others	U. S.	U. K.	Cont.	Orders	Others	1933	1932	1933	1932
Sept. 8	295	...	193	732	...	7,111	813	14,663	19,011	1,438	5,810	2,220	15,168	35,128	746	43,036	56,643	3,150	7,087
Sept. 15	185	...	299	366	...	7,591	813	15,155	20,109	1,438	5,810	2,279	16,211	36,624	746	45 106	67,670	2,756	5,926
Sept. 22	94	...	118	173	...	7,685	813	15,273	20,282	1,438	5,849	2,314	16,384	37,652	746	45,491	62,945	2,362	5,512
Sept 29	8	...	299	417	...	7,693	813	15,572	20,699	1,438	6,195*	2,491	17,333	38,369	746	46,215	65,134	2,362	5,906

*bushels, 000 omitted.

Indian Flaxseed Shipments

	Exports in Bushels*			Same Week Last Year*			Since Apr. 1, 1933*			Since Apr. 1, 1932		Total	Total
Week Ending	U. K.	Cont.	Others	U. K.	Cont.	Others	U. K.	Cont.	Others	U. K.	Cont. Others	1933	1932
Sept. 8	964	240	16	4	16	32	3,852	1,972	328	112	940 188	6,152	1,240
Sept. 15	292	176	60	52	80	..	4,144	2,148	388	164	1,020 188	6,680	1,872
Sept. 22	380	28	..	16	..	..	4,524	2,176	388	180	1,020 188	7,088	1,388
Sept. 29	544	108	..	20	24	..	5,068	2,284	380	200	1,044 188	7,740	1,432

Krueger Brewery is planning for beer in tin containers with a lacquered interior. American Can is the maker.

Flaxseed Economics

Flaxseed news featured the Governments' crop report which indicated crop as of Sept. 1 of 7,009,000 bu. against 7,797,000 bu. a month earlier and a production of 11,787,000 bu. last season. Added to this was a Canadian Government crop estimate of only 756,000 bu. Rains in the Argentine are said to have come too late to be of much use.

Actual production of flaxseed in 1932 throughout the world was approximately 89,000,000 bu. as compared with 129,000,000 bu. in 1931. This year is going to show a still further decline in flaxseed production, it is reliably reported. Of the 4 large producing countries, India and Russia have probably produced about the same amount as in 1932. U. S. and Canada, with a total production of approximately 7,750,000 bu., are approximately 6,500,000 bu. behind last year. In the Argentine last year's official estimate was 52,280,000 bu. This year's preliminary forecast of 50,000,000 bu. is considered by experts to be premature.

Nearby flax supply situation is even more acute than the depressing outlook for this year's crops. Whereas last year Argentine shipped 20,470,000 bu. from Sept. 21 to Dec. 31, balance now available for export from the 1932 crop is officially estimated at less than 5,000,000 bu. India has already shipped 8,500,000 bu.; less than 2,000,000 bu. of exportable surplus are calculated for India. Of our domestic crop probably 3,000,000 bu. have been marketed as compared with 5,500,000 bu. during August and September of last year. Receipts of flax in Duluth and Minneapolis are so light at present that it gives grounds for some apprehension as to whether it will be possible to realize 7,000,000 bu. on this crop. A serious shortage of world flaxseed supplies is quite apparent.

The domestic market was interested in the arrival this month of an Indian flax shipment the first to appear in this market for quite a while.

Despite a brisk demand for oil and numerous shipping instructions prices declined somewhat as the month closed. In most quarters this is looked upon as very temporary in light of the present grave situation on world flaxseed crops.

A "Phone" Convention

Spencer Kellogg had most unique sales convention, bad for the railroads but good for A. T. & T. A telephone and loud speaker hook-up linked 25 branches with main offices. President Howard Kellogg addressed group followed by comments from each of the 25 branch managers.

German Flaxseed Subsidy

German flaxseed farmers are being further encouraged by a minimum price guarantee of 22 marks per 220 lbs. of flaxseed. Domestic linseed production has been infinitesimal in comparison with Germany's requirements. Imports for first 5 months of 1933 rose to 7,783 metirc tons from 5,163 metric tons for same period of 1932.

Masco Moves

Masco Chemical (paint & varnish removers, linoleum lacquers, thinners) moved to new and larger quarters at 245 Lorraine Lorraine st., Brooklyn.

"Old Timer"

Kentucky Color & Chemical's Dr. G. A. Goodell was among the 42 "old timers" (those who attended the A. C. S. meeting held at the Columbian Exposition)honored at the banquet held at the recent Chicago meeting. Paul Wood (president, Paul Wood Co., San Francisco) arrived in N. Y. City via the Panama Canal.

E. Allen Smith, Jr., and W. Sherman Corwin, former chemist in production and research laboratories of Pittsburgh Plate Glass at Newark, N. J., have formed Smith-Corwin, Inc., East Rutherford, N. J., to make and deal in paints and lacquers.

Robinson Wagner (Hummel & Robinson successor) has appointed Fred. C. Sanders "Hi-Test" oxides representative in Columbus, Dayton, Louisville, Springfield and entire State of Indiana. Mr. Sanders was formerly with George S. Mepham & Co.

Holzapfol Dead

Albert Charles Holzapfol, 80, chairman and former president, International Paint, died in Germany Sept. 25 the result of an accident. G. A. Clarke, R. B. H. Lacquer Base, Bound Brook, N. J., died Sept. 26.

E. V. Peters, St. Joseph Lead, has been appointed as NRA advisor for the paint, varnish and lacquer industry.

Naval Stores

Under the A.A.A.

Naval stores producers (409) met Sept. 14 at Valdosta, Ga., at the call of H. M. Wilson, Jacksonville, chairman, committee drawing up marketing agreement, and by a 75% vote (181,648 units against 1,475 units) decided to adopt control of production in connection with the federal Agricultural Adjustment Act. The 409 producers meeting represented 60% of the 230,000 naval stores units produced in last year.

Following resolution was adopted:

"That we authorize chairman to appoint a committee of not less than 3 nor more than 5, including himself, to call upon the Secretary of Agriculture, or his deputy, and present said proposed agreement for approval or change by him.

"That we authorize said committee to notify Secretary of Agriculture of our approval of the general principles outlined in the said agreement and further authorize them to make such changes in the phraseology or detail of operation as may be required by the Secretary, and to complete the detail of preparation of the said agreement, secure the approval of the department officials and ask for a public hearing as required in the act.

August naval stores production by steam distillation and solvent treatment of wood and stocks of these products on hand Aug. 31, according to producers' committee, through Arthur Langmeier, Hercules Powder, secretary:

Production

	Rosin 500-lb. barrels	Turpentine bbls.(50 gallons)	Pine oil Gallons
Month of Aug	42,961	6,779	283,152
Total from Apr. 1, 1933	178,605	28,252	1,179,893

Stocks at Plants

Total Aug. 1 1933	57,010	5,496	
Mar. 31, 1933	98,615	12,387	
Change	—41,605	—6,891	

Note:—Rosin production and stocks include all grades of wood rosin.

Rosin, Turpentine Export Figures April-July

	Season—Rosin†			Season—Turpentine		
Country	*1933*	*1932*	*1931*	*1933*	*1932*	*1931*
United Kingdom	107,629	84,913	81,588	49,868	43,760	25,518
Germany	88,155	92,443	86,641	17,222	9,153	10,417
Italy	18,554	11,946	13,420	415	349	11
Netherlands	34,873	33,117	21,925	21,243	16,873	14,115
Belgium	9,353	10,732	5,114	5,282	3,995	5,242
Norway	4,973	4,224	1,775	.....	.....	.....
Sweden	13,811	8,930	9,060	.....	.....	.....
South America	69,723	61,314	68,626	2,927	2,653	5,434
Japan	22,660	18,416	47,359	420	237	247
Dutch East Indies	17,950	16,759	23,383	.....	.....	.....
Australia & New Zealand	3,492	4,726	5,080	2,571	5,139	5,054
Canada	19,638	16,446	17,400	10,337	9,317	10,295
Cuba	6,283	4,866	6,485	634	158	135
Europe	284,265	247,848	224,281	93,924	75,316	55,696
Total outside of Europe	153,472	137,716	180,084	18,361	18,895	23,058
Total	437,737	385,564	404,365	111,907	94,211	78,754

†In bbls. of 500 lbs., gum and wood rosin; April through July for both rosin and turpentine.

"That as preparations will be made for next year's crop within the next 60 days we respectfully request Secretary to order a public hearing in the city of Jacksonville, Fla., at the earliest possible date."

Committee was in Washington as the month closed and from reports received it appeared that the naval stores industry will function under the A. A. A. rather than through the NRA. Committee reported excellent progress being made in the negotiations with the Dept. of Agriculture officials.

Little Improvement

Trading in naval stores was mixed with with uncertainties. One guess is as good as another as to what part the NRA or the Agricultural Adjustment Act will ultimately play in the industry. If, as it is planned, to limit sales (limiting production has always been thought of as "next door to impossible") then higher prices over the next 12 months are practically a certainty. On the other hand it appears now that the present crop will run nearer to 20%, if not over, when compared with last season, although at the beginning of the 1933-34 year leading factors estimated that such increase would be under 15%. Sale of naval stores for export (most important in this industry) is wrapped up in the uncertainty surrounding the currency exchange question.

Trading in primary centers was light. Prices as shown in the market summary failed to register much improvement.* Buying was spasmodic. Consumers and 2nd factors appeared to wish to wait until "something happened" which would interpret coming trends more clearly. The bearish position of the higher rosin grades remained unchanged. Domestic turpentine tankcar business was not as active. Heavy receipts, of course, are responsible for most of the weakness. At the end of August 3 port statistics showed an increase in turpentine receipts of 19.4%. On Sept. 20 the increase had risen to 19.27%. Foreign buying, particularly for the Continent, was fair, but prevailing opinion among foreign buyers remains that for the moment at least further anticipating purchases are not necessary.†

Following table shows foreign movement for 1st 5 months of the naval stores year:

	Bbls. S.T. (50 gals.)	*Bbls. Rosin (500 lbs.)*
1933	148,630	549,028
1932	114,853	464,541
1931	116,961	498,662
1930	166,447	617,372
1929	180,463	645,588

Turpentine exports (gum spirits) amounted to 5,349,998 gals. valued at $2,229,420 during 1st 6 months of this year against 5,008,490 gals. ($2,013,877) in corresponding periods last year; wood turpentine shipments were 399,915 gals. ($158,619) against 281,943 gals. ($122,303).

Exports of gum rosin declined, totaling 406,206 bbls. ($2,706,590) this year against 470,112 bbls. ($2,717,150) in 1932, but loss was more than offset by the gain in wood rosin which totaled 105,564 bbls. ($593,879) against 68,101 bbls. ($395,503).

Pine oil shipments were reported as 351,265 gals. ($199,312) against 215,775 gals. ($123,762) a year ago.

*Prices 1st week in October sank lower.
†Wood rosin prices advanced Sept. 12.

French Rosin

French rosin producers report receipts of gum to be the largest in several years. Year's crop of gum will exceed by 15 or 20% that of last year. Production for 1933 is estimated at 7,556,571 gals. of turpentine and 87,182 metric tons of rosin. Based upon annual domestic consumption of 5,510,000 gals. of turpentine and 25,200 metric tons of rosin it will be necessary to export differences between production and consumption before next April in order that no stocks of both products are left from this year's crop.

Total exports for 1st half of 1933 from France were 162,609 gals. of turpentine and 14,524 metric tons of rosin.

Statistics of the Jacksonville Market

Grade	*Close Aug. 31*	*Sept. 9*	*Sept. 16*	*Sept. 23*	*Sept. 30*	*Same Time as Last Year*	*Net Gain or Loss Past Month*	*Net Gain or Loss from a year ago compared with 1932*
B	3.75	3.75	3.85	3.80	3.77½	2.40	+.02½	+1.37½
D	3.75	3.75	3.85	3.80	3.77½	2.50	+.02½	+1.27½
E	3.75	3.85	3.90	3.80	3.77½	2.55	+.02½	+1.22½
F	3.75	3.85	3.90	3.92½	3.77½	2.75	+.02½	+1.02½
G	3.75	3.85	3.90	3.92½	3.77½	2.85	+.02½	+.92½
H	3.75	3.85	3.90	3.92½	3.77½	2.85	+.02½	+.92½
I	3.80	3.85	3.92½	3.92½	3.77½	2.85	—.02½	+.92½
K	3.80	3.85	3.92½	3.92½	3.77½	3.25	—.02½	+.52½
M	3.80	3.85	3.92½	3.92½	3.77½	3.90	—.02½	—.12½
N	3.85	3.90	3.95	3.92½	3.80	4.00	—.05	—.20
W.G	4.00	4.15	4.15	4.10	4.00	4.55	.....	—.55
W.W	4.20	4.30	4.35	4.30	4.25	5.25	+.05	—1.00
X	4.20	4.30	4.35	4.30	4.25	5.40	+.05	+1.15
Market	Firm	Firm	Firm	Firm	Firm			

SPIRITS OF TURPENTINE

Price	40¾	41¾	42¾	41½	41¼	40½	+½	+¾
Market	Firm	Firm	Firm	Firm	Firm	Firm		

Week Ending	*Spirits Receipts*	*Spirits Sales*	*Resin Receipts*	*Resin Sales*	*Same as Last Year Spirits Receipts*	*Spirits Shipts.*	*Rosin Receipts*	*Rosin Shipts.*
Sept. 9	1,772	2,095	6,847	21,518	2,313	4,510	7,849	11,812
Sept. 16	2,253	342	7,144	2,250	2,120	522	8,868	4,431
Sept. 23	2,800	1,521	9,501	6,044	2,269	5,047	7,934	18,306
Sept. 30	5,680	5,369	19,074	10,752	2,840	1,351	9,476	7,968
This month	10,547	7,952	37,322	37,885	10,120	40	36,343	830
Since April 1	72,439	71,773	263,301	283,688	63,292	60,608	226,306	210,093
Foreign	.....	59,806	.....	189,919	.....	45,965	.....	136,601
Domestic	.....	11,967	.....	93,769	.....	14,643	.....	73,492

Stocks	*Spirits*	*Rosin*	*Same as Last Year Spirits*	*Rosin*
April 1	36,712	116,429	41,691	155,883
Sept. 1	34,791	98,605	45,422	180,353
Sept. 30	37,378	96,042	43,931	170,653

Statistics of the Savannah Market

Grade	*Close Aug. 31*	*Sept. 9*	*Sept. 16*	*Sept. 23*	*Sept. 30*	*1932—1933 High-Low*	*Same Time as Last Year*	*Net Gain or Loss Past Month*	*Net Loss or Gain from a Year Ago*
B	3.80	3.85	4.00	3.80	3.77½	2.50—1.45	2.40	—.02½	+1.37½
D	3.80	3.85	4.00	3.80	3.77½	2.60—1.65	2.45	—.02½	+1.32½
E	3.80	3.85	4.00	3.80	3.77½	2.95—2.00	2.65	—.02½	+1.12½
F	3.80	3.85	4.00	3.80	3.77½	3.10—2.05	2.85	—.02½	+.07½
G	3.80	3.85	4.00	3.80	3.77½	3.15—2.07½	2.85	—.02½	+.07½
H	2.80	3.85	4.00	3.80	3.77½	3.20—2.10	2.85	—.02½	+.07½
I	3.80	3.85	4.00	3.80	3.77½	3.25—2.15	2.90	—.02½	+.12½
K	3.80	3.85	4.00	3.85	3.77½	3.55—2.20	3.30	—.02½	+.47½
M	3.80	3.85	4.00	3.85	3.77½	4.20—2.90	3.90	—.02½	—.12½
N	3.85	3.90	4.00	3.90	3.80	4.70—3.30	4.05	—.05	—.25
W.G	4.05	4.15	4.15	4.10	4.00	5.00—3.55	4.75	—.05	—.75
W.W	4.25	4.30	4.25	4.25	4.25	5.50—3.60	5.50	...	—1.25
X	4.25	4.30	4.30	4.25	4.25				
Market	Firm	Firm	Firm	Firm	Firm		Firm		

SPIRITS OF TURPENTINE

Price	41	41¾	42½	41¾	41¼		41¼	+¼	...
Market	Firm	Firm	Firm	Firm	Firm				

All time high $2.33 Apr. 1, 1920; all time low 22c, Sept. 4, 1896; 1932-33 high 45c; low, 34½; 1933-34 high 50c July 8; low 37½ April 1.

Week Ending	*Spirits Receipts*	*Spirits Sales*	*Rosin Receipts*	*Rosin Sales*	*Same as Last Year Spirits Receipts*	*Spirits Shipments*	*Rosin Receipts*	*Rosin Shipments*
Sept. 9	2,304	364	7,143	2,965	2,496		9,721	
Sept. 16	2,524	303	9,387	4,166	2,179		7,852	
Sept. 23	3,152	520	11,414	6,342	1,950		6,907	
Sept. 30	3,293	400	11,514	4,169	2,406		9,537	
This mo. (4 wks)	11,273	1,587	39,458	17,642	9,031		34,017	
Since April 1 (Sept. 28)	84,838	....	291,143	.....	67,130		248,078	

Stocks	*Spirits*	*Rosin*	*Same as Last Year Spirits*	*Rosin*
Close Sept. 28	17,990	107,704	12,907	169,107
Close Aug. 31	18,315	116,344	16,331	189,400

London Naval Stores Market

Week Ending	*Rosin Weekly W.W.*	*High & Low Common*	*Turpentine Weekly High—Low*	*American Stocks Spirits 1933*	*1932*
Sept. 1	15s 9d	.....	48s—48s 9d	16,636	17,457
Sept. 8	15s 9d—17s	14s—14s 6d	48s—49s 6d	19,377	21,387
Sept. 15	17s	14s 3d—14s 6d	48s 6d—47s 9d	17,293	20,186
Sept. 22	17s	14s 3d	48s 3d—47s 9d	16,058	22,139
Sept. 29	17s	14s 3d	48s 3d—47s 3d	14,729	22,094
Close Sept. 30	17s	14s 3d	47s 3d	.....	.....

Fertilizers

One Thrill at Least

That Deputy Administrator Williams has lost none of his famed skill in directing well aimed barrages (he was an outstanding artillery officer in the World War and is a famed ordinance expert) became quickly apparent at the Fertilizer Industry Code Meeting Sept. 6 when Rep. John J. McSwain (S. C.), former Muscle Shoals House Committee chairman, charged that "the N. F. A. represents 80% of the fertilizer industry and this code will give it control over the remaining 20%. Minority will be strangled out of existance and what little competition there is will be eliminated. Code also violates the law in that it will oppress or eliminate small enterprises."

Fiery South Carolina Representative further charged, "the 3 government members on the administration committee probably will not be farmers and they will have no vote. . . . I suspect that the object of this committee will be to 'hist' prices. . . . I suspect that another object is to secure duty on fertilizers."

Mild mannered, courteous General Williams, whom the entire chemical industry has learned to respect, although not always in entire agreement with his views, told Representative McSwain that the Fertilizer Code had been given a great deal of study; that his charges were serious; that if he believed them to be true he should make them direct to the President.*

Secretary Brand presented vital statistics of the industry, showing that '29 sales amounting to $232,000,000 had fallen in '32 to $80,000,000. There are 800 fertilizer plants owned by 600 different companies. There are 100 superphosphate plants which purchase their sulfuric and 106 which produce their own. About 30% of the total sulfuric produced is used by the fertilizer industry. Nearly 35% of the year's deliveries are made in March and 85% in 1st 4 months of the year.

Fred N. Oliver, National Potash Producers' Association, asked that potash producers be permitted to come under a subcode of the Chemical Alliance. Indications seem to point to the likelihood that both the potash and nitrogen producers will come under the Alliance as sub-groups and that sulfuric producers, even those where the acid is primarily employed by companies for their own fertilizer production, will be forced into a sulfuric acid group. Of course only the sulfuric end of such businesses will be so included, remaining portion coming under the fertilizer classification.

Practically all of the changes made by the Recovery Committee at a meeting on Sept. 14 and those changes requested by the NRA officials have been harmonized and presidential approval is expected shortly. Fertilizer industry was the 1st division of the chemical field to submit a code, to have a formal hearing, and probably will have the honor of being 1st to receive presidential "blessing."†

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Cyanamid	$1.07½	$1.02½
Linseed cake	26.50	25.50
Phosphate rock, 68.70, 72%	5c a ton; others 10c a ton.	
Superphosphate, run of pile	7.50	7.00
16% flat	8.00	7.50
Tankage, fert. Chgo.	1.85	1.75
DECLINED		
Bone, raw S. A.	$25.00	$26.00
Imp. meal	25.75	26.00
Castor Pomace	16.50	17.50
Fish scrap, unground Ches. fact.	2.60	2.75
Fish meal, Balt.	38.00	40.00
Tankage, Chgo. feeding	$1.75	2.00
Dom. N. Y. grd.	2.45	2.60
Ungrd	2.35	2.50
Imp.	2.75	3.00

Brand Returns "Home"

N. F. A. Executive Secretary Charles J. Brand abandoned his $10,000 part-time Coadministrator of the Agricultural Adjustment Act position to return to full-time association activity as of Oct. 1.

Both Secretary of Agriculture Wallace and George N. Peek, Coadministrator with Mr. Brand, as well as the N. F. A. Secretary, denied that any friction or criticism of the latter's dual capacity caused the resignation. Both Mr. Wallace and Mr. Peek pointed out that Mr. Brand had simply been "borrowed."

"A great pleasure to be back with my people"—Charles J. Brand

From Washington; via the "grape-vine," came reports, however, that certain administration officials looked with disfavor on Mr. Brand's dual connection with 2 enterprises, 1 seeking a reduction in the output of farm products and the other engaged in selling a product to increase production of farm commodities. Most, if not all, of such talk has been, it is said, in a humorous vein, for it is well known that on numerous occasions in recent years responsible leaders of the fertilizer industry have urged upon the farmer less planted acreage but more intensive culti-

Sulfuric Production by 71 Superphosphate Producers

	July 1932	**June 1933*	*July 1932*	*Jan.-July 1933*	*Jan.-July 1932*	*Jan.-July 1931*
	Short tons†					
Production and purchases—						
Produced by reporting establishments—						
Totals	98,499	76,530	45,393	633,306	513,579	899,505
Northern district	79,919	66,312	38,755	441,038	373,072	623,921
Southern district	18,580	10,218	6,638	192,268	140,507	275,584
Purchased from fertilizer manufacturers—						
Totals	23,043	10,323	7,514	87,527	48,884	‡
Northern district	12,407	6,173	5,067	43,868	24,532	‡
Southern district	10,636	4,150	2,447	43,659	24,352	‡
Purchased from non-fertilizer manufacturers—						
Totals	16,147	13,320	13,677	87,321	90,283	193,354
Northern district	8,159	9,850	9,319	55,323	51,656	112,249
Southern district	7,988	3,470	4,358	31,998	38,627	81,105
Consumed in fertilizer manufacture and shipments—						
Consumed by reporting establishments in production of fertilizer—						
Totals	71,372	53,586	32,590	529,858	387,747	904,121
Northern district	45,001	40,630	22,397	294,550	229,985	535,025
Southern district	26,371	12,956	10,193	235,308	157,762	369,096
Shipments—						
To other than fertilizer manufacturers—						
Totals	38,885	30,819	14,242	198,558	151,484	244,714
Northern district	37,374	28,662	13,124	184,043	130,825	197,461
Southern district	1,511	2,157	1,118	14,515	20,659	47,253
To fertilizer manufacturers—						
Totals	13,251	14,236	4,478	97,889	109,051	‡
Northern district	10,082	13,829	4,074	76,017	83,228	‡
Southern district	3,169	407	404	21,872	25,823	‡
Stocks on hand—						
Totals	86,108	71,945	99,502	.....	.....	.....
Northern district	64,721	56,711	75,891	.....	.....	.....
Southern district	21,387	15,234	23,611	.....	.....	.....

*Revised. †Northern district, States north of Virginia-North Carolina line; Southern district, States south of Virginia-North Carolina line. ‡Data not available.

*Rep. McSwain clashed with Sen. Norris last May (CHEMICAL MARKETS, May, p. 434) over Muscle Shoals legislation. McSwain's House bill favored out and out operation of Muscle Shoals for commercial fertilizer production. The venerable Norris believed that such a policy was not economically sound. Norris took his case to President Roosevelt and won. The Norris Bill (with a few changes) was finally enacted into law (Tennessee Valley Authority).

†Final code approval is blocked, it is reported, (Oct. 9) due to refusal of certain nitrogen interests to permit their sales to dealers and consumers (made in competition with sales of nitrogen by fertilizer manufacturers) to come under the provisions of the Code that govern distribution of fertilizers. While potash interests likewise have not agreed, it is reported, that may do so shortly. Fertilizer Code has 18 distinct revisions.

vation of the remainder through liberal use of fertilizer.*

Said Secretary Wallace, "Mr. Brand brought to us an extraordinary fund of information and administrative experience."

Said Mr. Peek, life-long friend of Mr. Brand, "His rare knowledge of administrative procedure and machinery, as well as his understanding of agricultural economics has been of great assistance to the administration in the formative period of its existance."

Said Mr. Brand, "I have greatly enjoyed my association with Mr. Peek in starting the new and important work for agricultural restoration and general recovery, but it will be a great pleasure to be back with my own people."

Protests Jap Superphosphate

Alleged West Coast dumping of superphosphate, first by Holland, more recently by Japan, in past 2 years was charged in a 1-man hearing before Commissioner E. B. Brossard in Washington Sept. 12. Anaconda's Lee Vanderlinder, recommended that Commission should suggest tariff protection on superphosphate and phosphate materials. Eastern producers, shipping little to West Coast, did not join in protest, but appeared through Washington Attorney L. R. Mason, offering data if required.

Anaconda (United Metals Selling acts as superphosphate selling agent) first entered field to provide outlet for sulfuric fumes attending copper smelting and to give Western agricultural field local supplies. Most of the production is shipped, however, to the Coast from the plant at Anaconda, Idaho, meeting stiff competition from Japanese material. Company's plant is only survivor of 5 on the West Coast, others being forced to cease operations. Competition, stated Mr. Vanderlinder, has reduced output from 45,000 tons in '30 to mere 10,000 in '32 and only 1,000 to date in '33. Plant cost exclusive of bagging is $31-34 plus $7 rate to the Coast against Jap material selling at $22 Coast ports. Anaconda's 11 years operation has never returned cost of production, alleged Mr. Vanderlinder.

Commission's investigation is under its general powers in response to Senate resolution adopted last December. As phosphates and superphosphates are on the free list, no duty may be imposed on them except by act of Congress, and commission may only report findings with recommendations.

August Import

August fertilizer and fertilizer materials imports, totaled 102,028 long tons compared with 57,561 tons for last August and 127,600 for August, 1931. Largest increases were shown in receipts of guano, sodium nitrate, bone phosphates, muriate of potash, kainite, manure salts, and "other fertilizers." Decreases were shown in sulfate, cyanamid, superphosphate.

August fertilizer and fertilizer materials exports in August, totaled 90,433 long tons against 52,926 tons for August, 1932 and 115,385 tons for August, 1931. Exports of land pebble rock, superphosphate, and concentrated chemical fertilizers were much larger than those recorded in August, 1932. Exports of land pebble rock were more than double those for August, 1932. Exports of "other nitrogenous chemicals," chiefly domestic synthetic sodium nitrate, were 50% smaller than for August, 1932.

*September sales were 3% less than '32 sales in the South. Midwest gained over 40%, 5th consecutive monthly gain there.

August Fertilizer Tag Sales

	Equivalent tons*							
	August				January-August			
South—	P.C. of 1932	1933	1932	1931	P.C. of 1932	1933	1932	1931
Virginia	154	10,870	7,073	9,267	110	237,363	214,905	318,841
North Carolina	25	1,150	4,515	3,708	128	827,800	645,186	973,250
South Carolina	209	2,048	980	1,650	125	531,181	426,394	580,105
Georgia	384	1,881	490	....	109	389,298	355,654	684,622
Florida†	76	17,404	23,005	16,650	88	197,282	223,997	265,418
Alabama	300	1,200	400	600	134	271,550	202,150	417,400
Mississippi	...	450	....	....	102	85,397	83,616	195,336
Tennessee†	176	1,212	690	1,777	121	64,664	53,533	109,299
Arkansas	...	200	....	....	125	21,585	17,298	61,046
Louisiana†	300	1,350	450	100	117	38,194	32,575	74,333
Texas	500	250	50	100	93	27,560	29,723	57,942
Oklahoma	...	....	....	....	67	1,935	2,875	6,739
Totals, South	101	38,015	37,653	33,852	118	2,693,809	2,287,906	3,744,331
Midwest—								
Indiana	249	20,250	8,122	23,888	114	60,803	53,259	140,318
Illinois	...	971	55	328	86	8,579	10,010	27,290
Kentucky	221	1,845	833	3,390	96	49,812	51,705	99,474
Missouri	550	6,553	1,193	6,416	91	13,796	15,195	32,150
Kansas	...	518	12	172	151	2,181	1,445	1,703
Totals, Midwest	295	30,137	10,215	34,194	103	135,171	131,614	300,935
Grand totals	142	62,152	47,868	68,046	117	2,828,980	2,419,520	4,045,266

*Monthly records of fertilizer tags are kept by State control officials and are slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various States. †Cottonseed meal sold as fertilizer included.

United States Imports and Exports of Fertilizer and Fertilizer Materials By Classes—Total for All Countries—Long Tons

IMPORTS

	August			January-August		
	1933	1932	1931	1933	1932	1931
Ammonium sulfate	13,147	18,576	6,771	251,096	203,814	42,950
Ammonium-sulfate-nitrate	0	0	1	0	75	2,256
Calcium cyanamide	2,014	4,567	2,585	42,680	43,284	40,416
Calcium nitrate	963	0	0	13,619	3,705	26,079
Guano	5,246	20	88	42,207	3,298	13,569
Dried blood	1,895	245	865	3,879	2,740	6,567
Sodium nitrate	3,943	0	35,367	50,696	45,054	420,141
Urea and calurea	401	63	79	4,846	2,863	4,039
Ammonium phosphates	298	*	*	1,357	*	*
Tankage	2,916	1,544	1,197	17,152	14,102	13,916
Other nitrogenous	3,306	1,224	982	32,281	27,914	41,982
Total nitrogenous materials	34,129	26,239	47,935	459,813	346,849	611,915
Bone phosphates	2,587	1,334	2,507	18,753	19,594	34,883
Superphosphates	1,916	2,714	*	14,727	14,948	*
Phosphate rock	0	0	*	2,100	6,350	*
All other phosphates	100	15	7,351	713	3,875	16,834
Total phosphate materials	4,603	4,063	9,858	36,293	44,767	51,717
Muriate of potash	13,152	9,480	25,686	56,841	46,596	115,910
Kainite, 14%	5,674	2,607	4,007	25,245	38,687	47,871
Kainite, 20%	5,869	‡	‡	18,168	‡	‡
Manure salts, 30%	18,214	9,192	28,603	69,170	61,992	131,826
Sulfate of potash	5,942	2,343	6,741	26,213	14,340	35,478
Sulfate of pot. magnesia	4,577	*	*	10,245	*	*
Nitrate of potash	2,535	*	*	14,876	*	*
Other potash	82	28	6	412	326	357
Total potash materials	56,045	23,650	65,043	221,170	161,941	331,442
Nit-phos-& pot. fertilizers	241	242	3	4,793	1,240	9,063
Other fertilizers	7,010	3,367	4,761	53,634	28,696	31,458
Grand total	102,028	57,561	127,600	775,703	583,493	1,035,593

EXPORTS

Ammonium sulfate	789	349	449	4,783	14,284	56,927
Other nitrogenous chemicals†	7,256	14,383	6,558	49,965	86,664	41,433
Nitrogenous organic waste	583	502	675	4,467	4,399	4,126
Total nitrogenous materials	8,628	15,234	7,682	59,215	105,347	102,486
High grade hard rock	7,211	5,149	37,265	26,188	44,647	60,193
Land pebble rock	69,356	31,052	64,307	467,146	394,087	593,022
Total phosphate rock	76,567	36,201	101,572	493,334	438,734	653,215
Superphosphates	2,791	495	3,957	11,472	13,300	53,839
Other phosphate materials	70	12	366	541	949	3,279
Total phosphate materials	79,428	36,708	105,895	505,347	452,983	710,333
Potash fertilizers	144	3	1	14,470	504	20,402
Concentr'd Chem. fert.	1,881	809	1,424	8,442	8,054	21,814
Prepared fert. mixtures	352	172	383	1,079	1,046	4,282
Grand total	90,433	52,926	115,385	588,553	567,934	859,317

*Not previously stated separately.
‡Included in Kainite, 14%.
†Chiefly domestic synthetic sodium nitrate.

Cyanamid Higher

Fertilizer prices, with the exception of tankage, (weak because several million little piggies who "went to market" in the Administration's attempt to raise hog prices by buying in animals under 100 lbs.) were generally higher. Cyanamid's cyanamid was raised 5c per unit, new quotation being $1.07½. Abroad indications point strongly to better understanding between Chilean and synthetic nitrate factors and prices in England of both are now identical. Whether this means anything here is a difficult question to answer at the moment.*

Under the schedule recently adopted for phosphate rock 68, 70, 72% grades were advanced 5c a ton; others 10c. No final confirmation could be obtained of the outcome of the reported International Phosphate Cartel, with the French African producers and Americans playing a leading part. The higher prices for rock recently announced would seem, however, to point to such an agreement.**

Despite constant threat of foreign superphosphate and actual severe competition on the Pacific Coast from Japanese material, Eastern producers announced Sept. 30 a 50c advance, due, of course, largely to the rise in rock prices. Some talk in the trade was to the effect that the increase would be $1 a ton. Domestic sulfate sulfate producers continued to quote $24, but rumors were in the market of $26 before very long (December ends the current contracts).

Imports in August were 13,147 tons, of which 8,452 tons came from the Netherlands, 2,477 tons from Canada, 2,000 tons from Belgium and 218 tons from Japan. The 13,147-ton total compared with 10,666 tons in July, and the total imported for the first 8 months of the year was 251,096 tons. Estimated domestic production of sulfate in August, as measured by by-products coke operations, was 49,698 tons, compared with 47,613 tons in July and 24,957 tons in August last year. Estimated production for the 1st 8 months of the year was 277,545 tons, against 243,240 tons in the corresponding period of 1932. The new supply of sulfate in August, as represented by the sum of imports and estimated domestic production, was 62,845 tons, against 58,279 tons in July.

Situation on sodium nitrate appeared unchanged and prices were firm. Potash prices are still unknown. Domestic producers have gotten together with a code under the protective wing of the Chemical Alliance. They did not take kindly to inclusion with the fertilizer industry.

Generally speaking tonnages were fairly satisfactory for this time of the year. Market for American mixed fertilizers in foreign countries has steadily improved because of the currency situation.

*N. F. A., taking cognizance of press articles, emphatically denied Sept. 20 that farmers have received money as benefit payments to buy fertilizer for use on the acreage remaining in cotton, stating that such action would have violated contract made with Government and would reflect seriously on the farmers' integrity; also that the Agricultural Adjustment Administration was unable to make payments until Sept., 2 months after fertilizer can effectively be used.

†Mr. Miller was a son-in-law of the founder of Davison Chemical, and succeeded to the presidency at the latter's death. Mr. Miller was succeeded by Henry E. Treide, Nov. 28, 1932 (CHEMICAL MARKETS, now CHEMICAL INDUSTRIES, Dec. '32, p. 536. See also CHEMICAL MARKETS, June '33, p. 544, also July, '33, p. 68).

**Agreement, it is reported, Oct. 10, leaves each party free to sell in Europe, but limits U. S. sales to certain percentage based on country's consumption.

Miller Is Defendant

Davison Chemical's former president C. Wilbur Miller is defendant in 2 suits, 1 for $1,000,000 (entered by Waldo Newcomer and the other for $750,000 entered by Baltimore Trust. Both suits are over promissory notes.†

On May 31 Mr. Miller instituted proceedings in the Baltimore Superior Court asking $5,000,000 damages from a number of internationally known financiers and companies. He named 14 individuals and corporations, among them, James Bruce, president Baltimore Trust, Henry E. Treide, former director Baltimore Trust and Mr. Miller's successor as president of Davidson, who is now one of the receivers. Mr. Miller charged defendants had engaged in an unlawful and wrongful conspiracy, resulting in the improvishment of the plaintiff and wrecking of Davison and its subsidiary, Silica Gel.

Committee formed by investment banking house of Strother, Brogden & Co., Baltimore, plans to investigate Davison Realty affairs, formed years ago as a Davison Chemical subsidiary to develop for residential purposes, land near Davison works at Curtis Bay. Realty company followed the parent corporation into a receivership, (CHEMICAL MARKETS, June 33, p. 544), and it has been charged that none of the purposes for which it was formed have ever been realized, nor any definite step taken to this end. Committee includes Dr. A. R. L. Dohme, former Sharp & Dohme president.

Letter issued by banking firm points out that interest on realty company's 10-year notes, which was guaranteed by Davison Chemical, was defaulted Apr. 1 and that U. S. District Court in Baltimore consolidated, June 25, proceedings against the realty company with those against the chemical company. Court appointed receivers for the chemical company July 25 and named as a receiver for the realty company the same persons as those designated for the chemical company, with special counsel to the receivers for the realty company to investigate and determine upon such proceedings, if any, which should be instituted by the receivers in regard to the realty company notes.

Committee is soliciting execution by noteholders of an agreement and power of attorney authorizing group to act in their behalf.

Domestic Potash Sales

A. C. S. members heard Dr. J. W. Turrentine, Bureau of Chemistry & Soils, report Sept. 12 that "The ratio of domestic sales of potash to total quantity of fertilizer potash consumed has advanced from 16% in 1929 to 37% in 1932." Dr. Turrentine warned that sweeping conclusions should not be drawn from this 100% increase in proportion of American over foreign potash used. Recent abnormal conditions, he explained, have been accompanied by a 50% reduction in fertilizer sales.

When asked about future development of American potash, Dr. Turrentine said that the bureau is devoting particular attention to the problem of providing cheap potash for the Middle West and North-west. This potash may be obtained from abundant volcanic lavas of Wyoming. Fortunately this potash supply exists close to the world's greatest known phosphate deposits in Wyoming, Idaho, Utah and Montana, and is also near cheap coal and other raw materials. This situation offers advantages for low cost production of fertilizers containing both potash and phosphates required in a territory now inadequately supplied.‡

‡German, French and American potash reviewed in series of articles written by Expert George W. Stocking, University of Texas (*Chemical Markets*, Mar. '31, p. 247; Apr. '31, p. 368; May '31, p. 482)

Dept. of Agriculture estimated recently area contained 12,000,000,000 tons of calcium phosphate (CHEMICAL MARKETS, Apr. '33, p. 345).

Statistics on Calcium Acetate and Methanol†

Methanol

	1931 July	1932 July	1933 June	1933 July	Totals, 7 months (Jan.-July) 1931	1932	1933
			Gallons				
Refined—							
Wood distillation—							
Production	79,888	83,534	98,131	153,199	1,276,752	761,384	836,723
Shipments	125,623	117,248	131,203	108,628	1,215,778	668,261	694,647
Stocks, end of month	387,016	242,573	315,680	360,251	.....	.....	.....
Synthetic—							
Production	437,805	793,639	559,002	561,918	4,826,070	4,396,846	2,767,775
Shipments	283,866	294,433	830,220	732,735	2,859,505	2,923,710	4,704,937
Stocks, end of month	3,062,605	3,351,265	1,444,329	1,273,512	.....	.....	.....
Crude—							
Production	144,473	111,113	170,368	210,709	2,425,868	1,502,316	1,586,570
Shipments	*	*	149,585	258,200	*	*	1,579,646
Stocks, end of month	594,310	558,374	317,110	285,619	.....	.....	.....

Acetate of Lime

			Pounds				
Production	867,572	816,393	2,056,069	3,096,009	32,256,903	19,779,446	22,391,395
Shipments	4,734,360	1,479,229	3,678,422	5,470,405	32,639,146	23,016,974	22,923,165
Stocks, end of month	22,247,741	6,591,320	8,977,620	6,610,174	.....	.....	.....

*Date not available. †33 establishments.

Oils and Fats

Soybean Oil Decline

The oils moved within comparatively narrow limits in September. Purchasing was largely for immediate needs only and consumers did not seem to be greatly interested in building up further inventory stocks already existing. The day to day movement, at times quite pronounced, reflected, of course, the path of the dollar in terms of foreign exchange. Importers of chinawood are skeptical of replacement costs and are, therefore, quoting over quite a wide price range on futures. As the month closed the tone of the Far Eastern markets on both chinawood and coconut appeared to be improving.

Perhaps the outstanding feature of the month was the reduction in soybean. New crop perilla was reported late in the month to have been quoted at 8c in tanks. Last Government corn crop report places the indicated crop at 2,285,000,000 bu. against 2,273,000,000 a month earlier and 1932 harvest of 2,876,000,000. Trading in crude cottonseed oil was quiet throughout the month. Prices quite naturally followed the rather erratic ups and downs of the stock and other commodity markets, the general tendency being downward. Quotations for prime crude were as follows as the month closed: Atlanta 3½c; Valley and Southeast generally, 3½c; Texas and Oklahoma 3¼c. Quotations on 7% meal in the Southeast ranged from $19 to $20 per ton and in the Valley 41% meal was quoted at $16.50 to $18 a ton. Cotton ginned to Sept. 16 was 3,100,701 bales against 2,645,574 bales in the same period a year ago and 2,092,758 bales 2 years ago. The Government cotton crop report, larger than was generally expected, added a generally bearish attitude on prices.*

*Oct. 1 Government forecast was 12,885,000 bales compared with 12,414,000 a month ago and 13,002,000 produced last year. Condition Oct. 1 was 66.7% compared with 67.5 a month ago, 54.2 on Oct. 1 last year and 57.1, the 10-year average on Oct. 1.

Netherlands saponified stearic acid has been "dumped" (sold at less than its fair value, based on its price in the home market) to the injury of domestic producers Treasury Dept. announced Sept. 21, and an anti-dumping order issued.

New Companies

L. N. Jackson, F. W. Burnside and O. E. Vongehr, prominent in wood oil industry, have formed 2 corporations which have taken over McKesson & Robbins' wood oil dept. Concerns are O. E. Vongehr Federal, Inc., U. S. A., which will control operations in China, and L. N. Jackson & Co., Inc., with offices at 29 Broadway, N. Y. City, sales unit of the organization.

Entire China organization of McKesson & Robbins, including offices in Hankow, Shanghai, Wanhsien and Chungking and the storage installation at Wanhsien, has been taken over by O. E. Vongehr Federal, Inc., U. S. A.

Wilbur-Ellis Co. and J. H. Redding Co., consolidated Sept. 14. Business will be carried on under name of Wilbur-Ellis & Redding, Inc., 17 Battery Place, N. Y. City. Company will be under the direction of John F. Dallon, Wilbur-Ellis and J. H. Redding and Robert S. Hebert of J. H. Redding Co.

Wilbur-Ellis has been carrying on a brokerage business in vegetable and crude fish oils, while J. H. Redding has been trading in palm oil, palm kernel oils, denatured olive oil, sulfur olive oil foots and rapeseed oil. New firm will handle all these oils, and, in addition, corn oil, soy bean oil, coconut oil and peanut oil. Agencies will be maintained at San Francisco, Los Angeles, Seattle, Vancouver and Manila. Wilbur-Ellis & Redding will act

Cottonseed Statistics

	On hand August 1	*Produced Aug. 1 to Aug. 31*	*Shipped out Aug. 1 to Aug. 31*	*On hand August 31*
Crude oil, pounds—				
1933-1934	*52,444,039	70,878,254	65,339,722	*58,826,492
1932-1933	29,523,581	46,011,638	45,891,659	29,177,050
Refined oil, pounds—				
1933-1934	†676,163,044	‡58,090,075	.....	†640,607,152
1932-1933	628,420,148	39,779,637	.....	525,696,832
Cake and meal, tons—				
1933-1934	160,631	106,632	88,410	178,853
1932-1933	114,656	70,907	86,849	98,714
Hulls, tons—				
1933-1934	76,841	65,254	43,953	98,142
1932-1933	162,773	43,587	70,360	136,00
Linters, running bales—				
1933-1934	72,772	38,093	40,489	70,376
1932-1933	235,521	21,549	49,224	207,846
Hull fiber, 500-lb. bales—				
1933-1934	985	1,057	1,055	987
1932-1933	4,138	.....	340	3,798
Grabbots, motes, etc., 500-lb. bales—				
1933-1934	4,067	2,204	4,408	1,863
1932-1933	15,250	544	1,327	14,467

*Includes 5,409,842 and 10,280,748 lbs. held by refining and manufacturing establishments, and 14,020,860 and 9,993,875 lbs. in transit to refiners and consumers August 1, 1933, and August 31, 1933, respectively.

†Includes 5,594,830 and 6,650,644 lbs. held by refiners, brokers, agents, and warehousemen at places other than refineries and manufacturing establishments, and 12,775,346 and 2,509,304 lbs. in transit to manufacturers of lard substitute, oleomargarine, soap, etc., Aug. 1, 1933, and Aug. 31, 1933, respectively.

‡Produced from 63,521,788 pounds of crude oil.

Exports for Twelve Months Ended August 31

	1933	*1932*
Oil, crude ..... lbs.	33,364,451	32,483,896
Oil, refined ..... lbs.	10,166,512	10,250,019
Cake and meal ..... tons of 2,000 lbs.	150,283	215,952
Linters ..... running bales	183,970	116,319

Price Comparison, Vegetable, Fish and Animal Oils, Principal Points

Oil	*San Francisco*		*Chicago*		*N. Y. City*	
	Aug. 28	*Sept. 25*	*Aug. 30*	*Sept. 29*	*Sept. 2*	*Sept. 29*
Vegetable Oils:						
Coconut crude, tanks	2⅞ Mills P. C.	2¾-2⅞ Mills P. C.	3 P. C.	2¾ P. C.	2¾-3 Mills P. C.	2⅞-3 Mills P. C.
Chinawood, tanks	6⅞-7 P. C.	7⅛ P. C. ports	7.7 Chgo.	7.7 Chgo.	7.1 del.	7¼-7⅜ del.
Corn crude, tanks			4½ Chgo.	4¼ Chgo.	4¾-4⅞ Mills	4⅜-4½ Mills
Peanut crude, tanks	5 Mills P. C.	5¼ Mills P. C.	5½-6 Mills	5 Mills	4½ Mills	4½ Mills
Perilla, tanks	9⅜-9½ P. C.	9¾ P. C. ports			10-10¼ dr. del.	9 f.o.b. P. C.
Soybean crude, tanks	8⅛ del P. C.	8¼ del. P. C.	7⅛ Mills	6¾ Mills	8 Mills	7 Mills
Fish Oils:						
Cod, bbls			27-28	29-30 del.	29-32 del.	31-32 del.
Menhaden light pressed, tanks			5¼ del.	5¼ del.	5.3-5.9 f.o.b. P. P.	4.9 f.o.b. P. P.
Sardine, tanks	21-22 P. P.	19 f.o.b. P. P.	22-23 del.	20-22 del.	21-22 P. C.	19 P. C.
Salmon tanks	19 P. P.	19 f.o.b. P. P.	20-21 del.	20 del.	19 P. C.	19 P. C.
Sperm, tanks						
Whale, tanks	3½-4 P. P.	3½-4 P. P.	3½-4 f.o.b. P. C.	3½-4 f.o.b. P. C.	3½-4 f.o.b. P. C.	3½-4 f.o.b. P. C.
Animal Oils:						
Degras Com. dom			3-3¼	3-3¼	2¾ f.o.b. P. P.	2¾ f.o.b. P. P.
Neut. dom			7¼	7¼-7½	7¼-8 f.o.b. P. P.	7¼-8 f.o.b. P. P.
Lard No. 1			6¾-7	6½-7	7¼	7 del.
No. 2			6¼-6½	6-6½	7	6½ del.
Tallow, acidless, tanks			6¼-6¾	6¼-6¾	6¾ del.	6¾ del.
Stearic Acid Dist., Single Pressed			8¾-9	8¾-9	9-9½ del.	9-9½ del.

P. C.—Pacific Coast; P. P. producing points; del. delivered.

as representatives of several large European crushers.

Mr. Dallon previous to his connection with Wilbur-Ellis was with Brown-Edwards for 6 years and with Balfour Williamson for 12 years. Mr. Redding was connected with United Africa Co. for about 25 years and was president of that company. Mr. Hebert was with the same company for 15 years prior to the formation of J. H. Redding Co. within the past year.

World Oil Production

World production of vegetable oils is smaller this year than last, but supply of animal oils and fats is considerably larger, says the Bureau of Agricultural Economics, (Sept. 27) reporting on the world situation in oils and oil seeds. Stocks of most oleaginous products, especially edible products, are larger than a year ago.

German policy of self-sufficiency in animal fats is reported the outstanding development in the international trade factors affecting oleaginous products. Butter imports by Germany are controlled by contingents, and lard imports are checked by an import duty of about 15c a lb. Butter substitutes industry in Germany is restricted by raw material import controls and production quotas.

There has been a well defined price advance for most oils in U. S., but the bureau points out that supplies of butter, lard, and substitutes for both these commodities are still more than adequate to meet existing demand.

Decrease in world production of vegetable oils is attributed to lack of demand during 1932 and to reduced crops of oil-bearing materials last year and this year.

Soybean Situation

Manchurian 1933 soy bean crop is considerably larger than that of 1932. Last year Shanghai office of the Foreign Agricultural Service placed Manchurian soy bean crop at 4,320,000 short tons, a below-average crop. This year Shanghai office has not yet issued an estimate, but consular advices from Harbin report a crop 20% larger than in 1932. South Manchuria Railway places 1933 crop at 5,683,000 short tons, an advance of 21% over railway's 1932 estimate, on an acreage 3% larger than last year. Trade factors are inclined to regard railway's figures as too large. U. S. Assistant Agricultural Commissioner at Shanghai believes outturn will be near that of 1931, which the railway placed at 5,760,000 short tons. The 1932 crop was badly damaged by rains and floods.

Archer-Daniels-Midland's latest report on soy bean oil states: "According to data available it appears that there is again going to be an active demand for all soy bean oil produced from crop which will start coming to market in October. Drouth conditions have taken a heavy toll of the Illinois soy bean crop.

"Last year we produced 6,300,000 bu. of commercial soy bean in Illinois. Sept. 1 estimate places present Illinois crop at 55% of last year's crop, or 3,480,000 bu. We exported to Europe last year about 2,500,000 bu. It does not seem possible that Germany can afford to pay high prices prevailing for our domestic soy bean this year. Even without these exports we will have less commercial beans for crushing this coming year than we had last year.

"During crop season of 1931-1932 domestic mills crushed 4,725,000 bu. With soy beans reported on hand on June 30 domestic mills will crush this present year approximately 3,400,000 bu. If we take seed requirements from commercial soy beans available this year you can readily see that we have an appreciable quantity less for crushing during coming season if estimates on Sept. 1 are to be relied upon.

"We have been consuming increasing quantities of soy bean oil during depression. Ten-year average ended with 1930 showed an average annual consumption of 2,809,595 gals. For year ended Oct. 1, 1931, we consumed 4,260,019 gals. For year ended Oct. 1, 1932, we consumed 4,618,310 gals. For 9 months' period ended June 30, 1933, we consumed 3,464,377 gals. Stocks of oil reported on hand June 30, 1933, in oil and uncrushed beans was less than normal consumptive requirements for this period."

*Gulf Coast Tung Oil, Jackson, Miss., has asked for $6,500,000 Public Wks Loan to develop 900,000 acres of pine lands.

Tung Oil Imports

Hankow July tung oil exports totaled 17,982,000 lbs. compared with 20,986 000 lbs. shipped in June,

Of the total, U. S. received 15,656,000 lbs., as against 17,630,000 lbs. for preceding month and 5,516,000 lbs. for corresponding month of 1932.*

July European exports of oil amounted to 2,326,000 lbs., a decrease of 1,030,000 lbs. in comparison with total shipped to Europe the preceding month. Stocks on hand at Hankow July 31 amounted to 2,970 short tons.

Detailed statistics showing the exports of tung oil to U. S. and Europe from Hankow for comparative months and first 7 months of 1932 and 1933 are recorded below:

	Total exp. 1,000 lbs.	U. S. lbs.	Hankow stocks short tons
July, 1933	17,982	15,656	2,970
June, 1933	20,986	17,630	1,710
June, 1932	9,316	5,516	900
Jan.-July, 1933	95,018	75,886	.....
Jan.-July, 1932	63,962	49,446	....

Metals

Metal markets were without outstanding news in the past month. Only very minor fluctuations occurred in both zinc and lead. Both tin and silver reached new high marks for the current year. Mercury was stronger and closed at $66 a flask. Antimony prices stiffened with the decline of the dollar and higher prices ruled for platinum for the same reason. Copper remained quiet and unchanged.

Cartels Again

Members of the zinc cartel Sept. 30 unanimously approved continuation on the previous basis, but penalties for distribution have been slightly modified, benefiting previously dissident members.

Belgian producers had previously (Sept. 26) threatened to resign as of Oct. 31, giving as reason working of penalty provisions under changed foreign exchange conditions.

Unofficial negotiations have been started between Belgian and British copper producers meeting in Brussels to revive copper cartel which would regulate production. American producers will be asked to join.

Weekly Metal Statistics

Week Ending	Lead Weekly High & Low E. St. Louis	N. Y.	London per ton	Zinc Weekly High & Low E. St. Louis	N. Y.	London per ton	Copper Weekly High-Low Conn Valley Base	Tin Weekly High-Low Straits	Standard	Silver Bullion Weekly High-Low N. Y.	London (in Pence)
Close Aug. 31	.0435	.0450	.....	.0475	.0510	.....	.09	45.87	44.75	39.10n	.....
Sept. 8	.0435	.0450	£11 15s—£12	.0465—.04675	.0500 .05045	£16 13s 9d —£17	.09	45.00—45.87½	44.00—45.00	.36⅝—37	.18⅛—.18⅜
Sept. 15	.0435	.0450	£11 15s £11 18s 9d	.0465	.0500 .0502	£16 15s— £16 17s 6d	.09 .09	45.12½—46.25	44.00—45.90	.36⅝—.38⅝	.18⅛—.18⅜
Sept. 22	.0435	.0450	£11 16s 3d £11 18s 9d	.0465—.0475	.0500 .0510	£16 13s 9d £16 17s 6d	.09	47.50 —48.25	46.00—47.00	.38¾—.40⅛	.18¼—.18⅜
Sept. 29	.0435	.0450	£11 17s 6d —£12	.0475	.0510 .0512	£16 12s 9d —£16 15s	.09	47.15 —47.50	45.80—46.00	.39⅛—.40½*	.18⅛—.18½
Sept 30 close	.0435	.0450		.0475	.0510		.09	48.00 —25.00	46.80*	.39⅝	.18⅞
Net Gain for Month.								+2.38	+2.05	+11/20	
1933 High & Low		.0450 —.03		.05—.0260 .0325	.0535		.09—.05 .06¼	48.00 —21.75 24.50	47.00—21.10 23.75		
Oct. 1, 1932		.03			.0295						

n Nominal; *New 1933 high; Zinc dust prices; there is a differential of $.02 per lb. for carlots above St. Louis slab zinc market; 5 tons to carload, $.0275; less than 5 tons $.0325.

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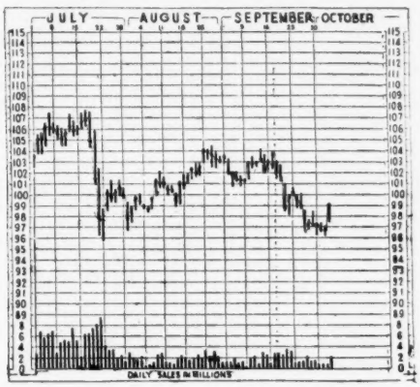
The Financial Markets

September Squall

Stocks ran into more "bad weather" in September after recovering smartly in August from the July "blow." August not only made good July losses but added something to spare; September's decline dissipated all of August's total appreciation of values.

Daily Record of Stock Market Trend



N. Y. Herald Tribune

Two attempts were made to boost September values above the August high and each failed of their objective. Discouraged the market sank into a pessimistic frame of mind and at the end of the month prices were quite close to the low points of July.

Trading showed little change in volume from that prevailing in August. Interest centered largely in those stocks whose activity has been most pronounced in recent months.

As measured by changes in values of 240 stocks comprising 20 of the largest groups listed on the N. Y. Stock Exchange, (compiled by *N. Y. Times*) depreciation was 10½% in September, equal to $2,298,294,098 for the stocks in the compilation. It contrasted with a gain of 12%, equivalent to $2,275,261,709, in August, and compared with a loss of 3%, or $422,283,148, in September, 1932.*

While most groups moved lower in September, the coppers resisted selling the best and as a group showed gains in values for the month.

Since the end of September, 1929, values as measured by this index have increased in 20 different months, with the most consecutive gains scored in the 4 months of this year starting with March. Prices were at their lowest in mid-July, 1932. At the end of June of that year they were 84% lower than at the close of September, 1929. An irregular recovery since then has brought the level up to 62%. Actual loss in values at the end of last month was $32,127,592,501, against 1 of $42,946,553,134 at the end of June, 1932.

The following table shows group changes in September:

Group and Number of Issues	*Avr. Net Ch'ge in Points*	*Change in Values*
Amusements (5)	— .800	— $5,502,975
Building equip. (9)	—4.028	— 61,681,639
Business equip. (4)	—3.687	— 27,581,610
Chain stores (14)	—2.000	— 32,731,190
Chemicals (9)	**— 2.430**	**—128,228,866**
Coppers (15)	— .092	+ 25,403,291
Department stores (10)	—1.050	— 9,761,130
Foods (19)	—3.263	— 191,892,481
Leathers (4)	—2.219	— 2,672,685
Mail order (3)	—2.583	— 44,548,028
Motors (15)	—2.475	— 292,831,183
Motor equipment (7)	—2.268	— 12,162,452
Oils (22)	— .017	— 71,757,673
Public utilities (29)	—5.448	—645,036,962
Railroads (25)	—8.700	—549,057,483
Railroad equip. (8)	—2.969	— 42,094,852
Rubber (6)	—2.146	— 14,206,104
Steels (13)	—4.558	—145,335,825
Sugars (9)	— .722	— 707,889
Tobaccos (14)	—3.080	— 45,906,362
Average and total 240 issues	—3.196	—$2,298,294,098

Uncertainty

One word—"uncertainty"—splendidly summarizes the situation. Parades, speeches, and "ballyhoo" meetings over, the country is confronted with serious labor conditions; the problem of how to inflate—by currency or by credit is still unanswered; prices while rising, are not moving forward in anything like an orderly manner and no one knows where the end is. Offsetting these rather depressing factors are several very definite indications that business in many of its divisions is much better. Hence the confused state of mind and the rather wide up and down movements in the market.

Chemical Stocks

In August the chemical stocks led the way upward. In September they were merely "in the crowd." Nevertheless as contrasted with stocks generally the chemical group did not lose all of the gain registered in August. The net September loss for the 9 leading chemical companies in the group totaled $128,228,866 as against a net August gain of $331,595,207. Allied in September closed with but a net loss of 2¼ points as contrasted with a net gain in August of 24 points; du Pont lost 5¼ points last month as against a gain of 13¼ points 2 months ago. Texas Gulf Sulphur was the only 1 of the 9 in the group, however, to show appreciation for the month, gaining 4 points. The greatest loss was made in Carbide, 7 points. The net value changes for September were as follows:

Allied Chemical & Dye	$5,402,898
Commercial Solvents	6,925,241
Du Pont de Nemours	58,094,846
Mathieson Alkali Wks	487,827
Texas Gulf Sulphur	*10,160,000
Union Carbide & Carb.	64,588,559
U. S. Industrial Alcohol	1,858,380
Virginia-Carolina Chem.	601,521
Westvaco Chlorine Prod.	429,594
Total	—$128,228,866

The net changes from January through September have been as follows:

	Increases	*Declines*
January	$39,652,757	.....
February	.....	$168,411,582
March	24,037,138	.....
April	403,188,208	.....
May	385,593,391	.....
June	139,232,100	.....
July	.....	149,136,077
August	331,595,207	.....
September	.....	128,228,866
Total	$1,753,887,219	$445,776,525

Year's Net Appreciation

Gains have been registered in 6 months and declines in 3 months to date. The chemical group (as represented by the 9 leading stocks mentioned) still has a net appreciation for 1933 of $1,308,110,694. Comparatively few half-year financial reports were issued last month. It was too early, of course, to issue 3rd quarterly statements. For the chemical group as a whole, however, it is confidently expected that these reports will show the 3rd quarter earnings to be much better than the 1st or 2nd quarters. In most quarters the concensus of opinion is that the last quarter will at least equal the one just ended and in all probability will prove to be even better. With the end of prohibi-

*As of Oct. 1 total N. Y. Stock Exchange listed shares had a market value of $32,729,938,196, against $36,669,889,331 on Sept. 1. In August value increased $3,586,540,000. On Jan. 1 total was $22,767,636,718. Chemical stocks on the "Big Board" Oct. 1 had a value of $3,281,499,913 against $3,536,943,124 on Sept. 1 and $3,067,927,102 on Aug. 1. Average price Aug. 1, $43.56; Sept. 1, 50.14; Oct. 1, $45.83.

Price Trend of Chemical Company Stocks

	Sept. 1	*Sept. 8*	*Sept. 15*	*Sept. 22*	*Sept. 29*	*Sept. 30 Close*	*Net Change*	*1933 High*	*1933 Low*
Allied	140	135	137⅝	136½	135¼	136¾	—3¼	145½†	70¾
Air Red	104⅝	99¾	103¾	103¾	105	103	—1⅝	112†	47½
Anaconda	18	17	17⅛	16¾	15⅛	15⅞	—2⅛	22⅞	5
Col. Carbon	64¼	58¾	62¼	56	52	51	—3¼	71½	23⅛
Com. Solvents	38⅞	36½	38⅜	35⅝	35⅛	35¾	—3⅛	57¼	9
Du Pont	81⅞	79	79¾	76¾	74½	75½	—6⅜	85¾	32⅛
Mathieson	37½	35½*	40	37¾	38	37	— ½	43¾†	14
Monsanto	71¼	68	70	62	64½	63	—8¼	74½	25
Std. N. J.	41⅜	40¾	41½	41¼	39¾	39¾	—1⅝	43⅞†	22¾
Texas Gulf S.	32⅞	29½	33⅛	37⅝	36	36½	+3⅜	41†	15¼
U. S. I.	73⅜	69	74	67¾	65	67	—6⅜	94	13½

*ex-rights.
†new high in September.
‡new low in September.

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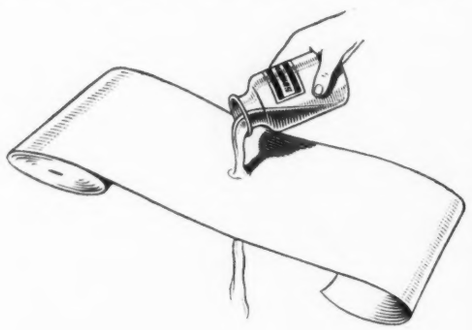

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tion now in sight by Dec. 8 and with the anti-freeze business close at hand earnings of the alcohol companies are expected to show a big increase in the final quarter.

Opposes V-C Retirement Plan

George S. Kemp, of Bryan, Kemp & Co., director of Virginia Carolina Chemical Corp., has sent a letter to holders of the 7% prior preferred stock of the corporation asking for proxies to vote against the proposed retirement of 84,871 shares of the prior preferred stock now in the company's treasury, at the annual meeting on October 11. He states that if the retirement is approved by stockholders, the prior preference stockholders will be deprived of their present right to elect a majority of the directors of the company.*

United Dyewood Recapitalization

United Dyewood has called special stockholders' meeting for Dec. 7 to authorize a recapitalization plan by which par value of the 45,000 shares of preferred and 139,183 shares of common, both now of $100 par value, will be reduced to $10 par value. This will reduce capital to $5,891,830 from $18,418,300. Capital surplus of $12,526,470 thereby created will be available as a reserve against contingencies as board of directors may deem advisable, and will make possible writing down of present $17,846,393 book value of investment in company's subsidiaries.

Lead Plan Consummated

Plan of exchanging 1 share of Eagle-Picher Lead stock for each 4 shares of Consolidated Lead & Zinc was approved at a special meeting of Consolidated Co. stockholders on Sept. 19. A total of 204,000 shares of the 250,000 outstanding were voted.

Final dissolution of Consolidated Co. was voted by the board of directors on Sept. 25. The Sept. 19 meeting was adjourned to Sept. 25 as a formality to complete the plan.

To Clear Dividend Arrears

Canadian Celanese, stockholders at special meeting in Montreal Oct. 31 will be asked to approve plan whereby dividend arrears on preferred would be cleared up. It is proposed to award to preferred stockholders $1.62 in cash for each preferred share, and 1 common share for each 2 preferred shares held.

On the basis of closing market price of the common on the Montreal Stock Exchange Sept. 25 of $26.50, distribution proposed for preferred shareholders would have total current value of $14.87 a share. Accumulated dividend arrears on preferred amount to $27.75 a share but through receipt of common stock preferred holders would be in a position to benefit from any dividends declared in future on the common.

*Bryan, Kemp & Co. led opposition to merger of V-C and Armour in '32. (CHEMICAL MARKETS, July, '32, p. 51; also Oct., '32, p. 346). George S. Kemp and 3 others were elected in October '32 to the Board to give representation to prior preferred stockholders. Preferred stockholders were victors in the proxy fight, Oct. 11.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs	$ .50	Sept. 14	Oct. 1
Air Reduction	.75	Sept. 30	Oct. 16
Air Reduction ext	.75	Sept. 30	Oct. 16
Allied Chemical	$1.50	Oct. 10	Nov. 1
Allied Chem. & Dye pf	$1.75	Sept. 11	Oct. 2
Alum. Co. of Am. 6% pf	.37½	Sept. 15	Oct. 2
Am. Home Products	.20	Sept. 14	Oct. 2
Am. Home Products	.20	Oct. 14	Nov. 1
Am. Maize Products	$1.00	Sept. 21	Sept. 30
Armour & Co. Del pf	$1.75	Sept. 11	Oct. 1
Can. Celanese 7% cu. pt. pf	$1.75	Sept. 18	Sept. 30
Celanese 7% 1st pt. pf accum	$4.00	Sept. 18	Sept. 30
Chickasha Cotton Oil spec	.25	Oct. 2	Oct. 16
Clorox Chemical	.50	Sept. 20	Oct. 1
Clorox Chemical	.50	Dec. 20	Jan.1'34
Colgate-Palmolive-Peet pf	$1.50	Sept. 11	Oct. 1
Colgate-Palmolive-Peet pf	$1.50	Dec. 11	Jan.1'34
Corn Prods. Ref	.75	Sept. 29	Oct. 20
Corn Prods. Ref	A1%	Sept. 29	Oct. 20
Corn Prods. Ref. pf	$1.75	Sept. 29	Oct. 16
Devoe & Raynolds 1st pf	$1.75	Sept. 20	Oct. 2
Devoe & Raynolds 2nd pf	$1.75	Sept. 20	Oct. 2
Du Pont, E. I. deb	$1.50	Oct. 10	Oct. 25
Eastman Kodak	.75	Sept. 5	Oct. 2
Eastman Kodak pf	$1.50	Sept. 5	Oct. 2
Freeport Texas 6%	$1.50	Oct. 13	Nov. 1
Hazel Atlas Glass	$1.00	Sept. 16	Oct. 2
Heyden Chemical pf	$1.75	Sept. 21	Oct. 1
Hygrade Sylvania $6.50 pf	$1.62½	Sept. 1	Oct. 2
Industrial Rayon	$1.00	Sept. 18	Oct. 1
Int. Salt Co	.37½	Sept. 15	Oct. 2
Int. Nickel of Can. pf	$1.75	Oct. 2	Nov. 1
Jones-Laughlin cum pf	.25	Sept. 13	Oct. 2
MacAndrews & Forbes pf	$1.50	Sept. 30	Oct. 14
MacAndrews & Forbes	.50	Sept. 30	Oct. 14
Mathieson Alkali	.37½	Sept. 8	Oct. 2
Mathieson Alkali pf	$1.75	Sept. 8	Oct. 2
Merck Corp. pf	$2.00	Sept. 16	Oct. 2
Merck Corp. pf	$2.00	Dec. 16	Jan 2'34
Monroe Chem. pf	.87½	Sept. 15	Oct. 1
Monsanto Chemical	.31¼	Sept. 9	Oct. 2
Nat'l Lead	$1.25	Sept. 15	Sept. 30
Nat'l Lead pf B	$1.50	Oct. 20	Nov. 1
N. J. Zinc	.50	Oct. 20	Nov. 10
Parke Davis	.25	Sept. 19	Sept. 30
Penn Salt	.75	Sept. 30	Oct. 14
Pitts. Plate Glass	.15	Sept. 9	Oct. 2
Pratt & Lambert	.12½	Sept. 18	Oct. 2
Proctor & Gamble 8% pf	$2.00	Sept. 22	Oct. 14
Spencer Kellogg	.25	Sept. 15	Sept. 30
Union Carbide & Carbon	.25	Sept. 1	Oct. 2
United Carbon	.25	Sept. 16	Oct. 2
United Dyewood pf	$1.75	Sept. 25	Oct. 2
United Piece Dye pf	$1.62½	Sept. 20	Oct. 2
Vulcan Detinning pf	$1.75	Oct. 6	Oct. 20
Westvaco Chlorine 7% pf	$1.75	Sept. 15	Oct. 1
Will & Baumer pf	$2.00	Sept. 20	Oct. 2

APayable in common stock.

Annual and Special Meetings

	Record Date	Meeting Date
Canadian Celanese (spec)		Oct. 31
Proctor & Gamble	Sept. 22	Oct. 11
Spencer Kellogg	Oct. 14	Nov. 13
Virginia-Carolina Chem	Sept. 15	Oct. 11

Dividend Action

U. S. Smelting, Refining & Mining declared an extra dividend of 50c on the common and the regular quarterly dividends of 25c on the common and 87½c on the preferred, all payable Oct. 14 to stock of record Oct. 5.

Air Reduction declared Sept. 13 extra dividend of 75c in addition to regular of the same amount, both dividends payable Oct. 15 to stock of record Sept. 30.

Libbey-Owens-Ford Glass has declared a dividend of 30c on common, payable Oct. 2 to stock of record Sept. 15. Last previous payment was on Sept. 1, 1930, when a quarterly dividend of 25c was paid.

American Smelting & Refining has declared a dividend of $1.75 on 7% preferred, on account of accumulations, payable Dec. 1 to stock of record Nov. 3. This is 1st declaration since June 1, 1932.

Corn Products Refining declared a stock dividend of 1% in common stock on the common, payable Oct. 20 to stock of record Sept. 29. Common to be distributed represents issued stock. There will be no change in the present outstanding stock.

Regular quarterly dividend of 75c on the common and $1.75 on the preferred also were declared. Common dividend is payable Oct. 20 and the preferred Oct. 16, both to stock of record September 29.

N. Y. Curb removed Worcester Salt common from unlisted trading Sept. 8.

Mass. Bars Solvay Amer.

Sale of 5½% cumulative preferred stock of Solvay American Investment has been barred in Massachusetts by the securities division, Dept. of Public Utilities under Section 7 Chapter 110-A of the general laws.

Securities division and Solvay American Investment Corp. have had differences of opinion as to exact status of the company since early this year, division holding it came under heading of investment trusts and was required to file information quarterly. Company maintained it was a private holding corporation.

Solvay American has declared regular quarterly dividend of $1.37½ on the preferred, payable Nov. 15 to stock of record Oct. 16.

Foreign Markets

London	July 31	Aug. 31	Oct. 2
British Celanese	16s 9d	16s 6d	15s 3d
Celanese	£7¾	£10	£9¼
Courtaulds	£1⅞	£2	£2
Distillers	79s 3d	83s 9d	82s 6d
I. C. I.	29s 7½d	29s 7½d	29s 9d
Un. Molasses	13s 9d	14s	13s
Paris			
Kuhlmann	650	690	650
L'Air Liquide	810	810	770
Berlin			
I. G. Farben	132	120	116
Milan			
Italgas	...	...	...
Montecatini	109	111½	119¾
Snia Viscosa	164½	173¾	182¾

Over the Counter Prices

	August 31		September 30	
American Hard Rubber	13	16½	8	12
Dixon	45½	50	40	48
Merck, pfd	98½	101½	98	101½
Worcester Salt	48	53	..	..
Young, J. S., pfd	84	..	82½	..
Young, J. S., com	58½	..	59	..

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Earnings at a Glance

Company	Annual Dividends	Net Income 1933	Net Income 1932	Common Share Earnings 1933	Common Share Earnings 1932
Am. Agricultural Chem.:					
Year, June 30	f	†$508,127	†$1,224,056	....	....
Amer.-La France & Foamite:					
June 30 quarter	f	†$72,299	†$102,612	....	....
Six months, June 30	f	†122,425	†222,970	....	....
Archer-Daniels-Midland:					
Year, June 30	$1.00	$1,209,293	$882,343	$1.79	$1.17
Devoe & Raynolds:					
August 31 quarter	f	‡417,361	*	....	....
Nine months, Aug. 31	f	‡465,000	†128,000	....	....
Glidden Co.:					
Ten months, Aug. 31	f	1,096,912	‡52,360	1.11	p.50
International Agricultural:					
Year, June 30	f	†1,060,096	†847,770	....	....
International Nickel:					
June 30 quarter	f	1,943,046	†629,327	.10	....
Six months, June 30	f	1,862,888	†93,255	.06	....
Leslie-California Salt Co.:					
Year, June 30	§1.40	239,345	197,709	2.05	1.70
United Dyewood Corp.:					
Six months, June 30	f	93,585	†105,722	p2.64	....
U. S. Smelting, Rfg. & Mng. Co.:					
Eight months, Aug. 31	§1.00	2,504,039	1,163,596	2.67	.09

fNo common dividend; †Net loss; ‡Profit before federal taxes; §plus extras.

Company Reports

International Reduces Net Loss

I. A. C. and affiliated companies for year ended June 30, certified by independent auditors, shows net loss of $1,060,096 after interest, depreciation, depletion and proportion of loss arising through operation of jointly owned corporations. This compares with loss in year ended June 30, 1932, of $1,247,531 after interest, depreciation, depletion and provision of $450,000 for bad and doubtful accounts receivable, but before surplus credit adjustments. After deducting profit of $199,761 on bonds purchased, and $200,000 reinstatement, in part, of investment in Kaliwerke Sollstedt Gewerkschaft previously written off, net loss for year ended June 30, carried to surplus, was $847,770.

Current assets as of June 30, including $1,527,977 cash, amounted to $6,331,648, and current liabilities were $342,666, comparing with cash of $748,481, current assets of $8,360,611, and current liabilities of $1,166,526 on June 30, 1932. Consolidated income account for year ended June 30, compares as follows:

	1933	1932	1931	1930
Gross profit	$826,148	$1,441,895	$2,850,125	$4,382,682
Expenses	1,129,094	1,395,943	1,897,492	1,836,925
Oper loss	$302,946	‡$45,952	‡$952,633	‡$2,545,757
Other income	64,172	43,756	84,552	121,453
Loss	$238,774	‡$89,708	‡$1,037,185	‡$2,667,210
Interest	354,976	428,527	448,498	469,713
Depr & depl	414,097	458,712	532,363	604,323
Loss on oper of joint own corps	52,249	.....	.....	.....
Prov for bad accts	.....	450,000	.....	.....
Loss	$1,060,096	$1,247,531	‡$56,324	‡$1,593,174
Prof bds purch	.....	199,761	4,353	68,002
§Reinstatement of invest	.....	200,000	.....	.....
Loss	$1,060,096	$847,770	‡$60,677	‡$1,661,176
Fed taxes	.....	.....	.....	135,000
Net loss	$1,060,096	$847,770	‡$60,677	‡$1,526,176
Pr pref divs	.....	.....	525,000	525,000
Deficit	$1,060,096	$847,770	$464,323	†$1,001,176

†Surplus. ‡Profit. §Reinstatement, in part, of investment in Kaliwerke Sollstedt Gewerkschaft previously written off.

Ducktown Chemical & Iron reports for year ended Dec. 31: Net loss, $485,496, contrasted with net income of $50,827, or $7.23 a share on 7,030 combined preferred shares, in preceding year.

Devoe & Raynolds, and subsidiaries, report for quarter ended Aug. 31, 1933, profit of $417,361 after expenses, depreciation, etc., but before federal taxes. For 9 months ended Aug. 31, last, profit before federal taxes was $465,990, comparing with net loss of $128,000 in corresponding nine months of preceding fiscal year.

Penn. Salt $325,746 Net For Year

Penn. Salt Manufacturing in report for fiscal year ended June 30, (certified by independent auditors) shows consolidated net income of $325,746 after depreciation, depletion, and federal taxes, equivalent to $2.17 a share (par $50) on 150,000 shares of capital stock. This compares with $363,147 or $2.42 a share in preceding fiscal year. Consolidated balance sheet as of June 30, 1933, shows total assets of $14,341,189 comparing with $14,739,596 on June 30, 1932, and earned surplus of $3,946,440 against $4,424,889. Current assets amounted to $4,659,421 and current liabilities were $650,098, comparing with $4,218,902 and $564,260, respectively, at end of preceding fiscal year. Cash and marketable securities totaled $1,118,929 against $900,073.

Glidden Profits Rise Sharply

Glidden reports August net profit of $174,053 after depreciation, federal taxes, etc., comparing with profit of $89,799 before dividends of subsidiary preferred stock now retired. For 10 months ended Aug. 31, 1933, net profit was $1,096,912 after depreciation, federal taxes, etc., equivalent after deduction of $374,720 dividend requirements on 7% prior preference stock, to $1.11 a share on 650,000 no-par shares of common. This compares with $52,360, equivalent after dividend requirements on subsidiary preferred stock to 50c a share on 69,000 shares of 7% prior preference stock in 10 months ended Aug. 31, 1932. Subsidiary preferred stock was called for redemption in October, 1932.

Chicasha Cotton Aided By Inventories

Chicasha Cotton Oil reports for year ended June 30: Net income after depreciation, Federal and State taxes, interest and other charges, $332,992, equal to $1.31 a share on 255,000 capital shares, against deficit of $120,926 in previous year; total sales and general earnings, $11,550,176, against $8,773,080. R. K. Wootten, vice-president and general manager, says: "This gain in profit margins for 1933 was due to rising commodity prices. Also profits for July and August due to low inventory cost." Cash holdings increased during year from $660,154 to $2,248,363. Current assets on June 30 were $3,635,147, and current liabilities $266,844.

Ansbacher-Siegle reports for year ended Sept. 30: Net loss, $50,826, contrasted with net income of $40,334, equivalent, after $2.40 convertible preference stock dividends, to 9c. a share on 39,966 common shares in preceding fiscal year.

Industrial Rayon and subsidiary report for 9 months ended Sept. 30, net profit of $1,258,033 after depreciation, interest and federal taxes equivalent to $6.29 a share on 200,000 no-par shares of capital stock. This compares with net loss of $210,928 in 1st 9 months of 1932.

For quarter ended Sept. 30, 1933, net profit was $571,792 after charges and taxes, equal to $2.86 a share comparing with net profit of $456,865 or $2.28 a share in preceding quarter and net loss of $96,115 in September quarter of previous year.

Probable Sulfur Earnings in 3rd Quarter

Increased business activity in summer months brought a sharp upturn in earnings of the 2 sulfur companies in 3rd quarter. Texas Gulf Sulphur probably earned more than $1 a share for its 2,540,000 shares of capital stock in 3 months just ended, against a net of $1,434,853 or 56c a share in corresponding 1932 quarter; $1,437,861 or 57c in the June 30, 1933, quarter and $976,703 or 38c a share in 1st quarter of this year. Freeport Texas does not report quarterly, but earnings in 3rd quarter are estimated at about 85c a share on 746,758 shares of common after preferred dividends, against a net of $1,019,091 or $1.27 a share in 1st 6 months of this year. In 1st half of 1932 net was $1,060,744 or $1.45 a share on 729,844 shares of common.

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The Industry's Securities

1933 September Last	1933 High	1933 Low	1932 High	1932 Low	Sales In September	Sales During 1933	Stocks	Par $	Shares Listed	An. Rate		Earnings $-per share-$ 1931	Earnings $-per share-$ 1930
NEW YORK STOCK EXCHANGE													
103	112	97	112 †	47½	63½	30¾	47,200	592,600	Air Reduction	No	841,288	$3.00		4.54	6.32
136¾	145½	131	145½†	70¾	88½	42½	72,600	2,229,600	Allied Chem. & Dye	No	2,401,000	6.00		6.74	9.77
123½	123½	121½	124*	115	120†	96½	900	25,800	7% cum. pfd	100	393,000	7.00			
25½	32½	25½	35	7½	15½	3½	24,900	243,300	Amer. Agric. Chem.	100	333,000		Yr. Je. '30		Nil
57½	72⅝	54½	89⅞	13	27	11	312,700	2,192,800	Amer. Com. Alc. (new)	20	375,000				d1.27
25½	28	25½	29½	9¾	15½	7	5,900	94,700	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30		1.68
25	30½	23½	39½	9	25½	7*	3,800	123,800	Atlas Powder Co.	No	261,438			.59	2.67
77½	83¾	77½	83½	60	79½	45½	210	6,394	6% cum. pfd.	100	96,000	6.00			
51	65	51	71½	23½	41⅞	13½	33,300	844,100	Columbian Carbon	No	538,420	2.00		3.02	5.04
35¾	41¾	33½	57½	9	13¾	3½	810,000	5,626,000	Comm. Solvents	No	2,530,000	.60		.83	1.07
86⅝	90½	85½	90⅝	45¾	55⅝	24¾	66,200	1,424,000	Corn Products	25	2,530,000	3.00		3.54	4.82
139	139½	136	145½	117½	140	99½	1,140	9,585	7% cum. pfd.	100	250,000	7.00			
75⅛	84	73⅛	85¼	32½	59½	22	222,100	5,087,860	DuPont de Nemours	20	11,008,512	2.00		4.29	4.67
110	114	107	117	97½	105¼	80¼	2,600	38,900	6% cum. deb.	100	1,098,831	6.00			
80	88	78	89¾	46	87¾	35½	31,400	531,518	Eastman Kodak	No	2,261,000	3.00		5.78	8.84
126	126	124	130	110	125	99	130	1,690	6% cum. pfd.	100	62,000	6.00			
42½	47⅛	40½	47⅝	16⅛	28⅛	10	76,300	694,900	Freeport Texas Co.	No	730,000	2.00		3.26	w4.77
41½	54½	42½	63	15	29½	13⅞	8,600	232,600	Hercules Powder Co.	No	606,234	1.50		1.04	2.61
104½	109½	104½	110	85	95	70½	340	3,830	7% cum. pfd.	100	114,241	7.00			
2½	3⅜	2⅜	5⅜	⅛	3½	¼	4,400	153,300	Intern. Agric.	No	450,000		Yr. Je.'30		1.68
13	17	13	27½	5	15	3½	400	23,700	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30		14.58
20	22⅜	18⅞	22⅜	6⅜	12½	3½	756,900	6,922,937	Intern. Nickel	No	14,584,000			.22	.67
16½	19	16½	22	7½	11	8	4,100	63,200	Kellogg (Spencer)	No	598,000	.60			h1.14
25½	36½	26½	50	10¼	22	9	30,400	776,100	Liquid Carbonic Corp.	No	342,000			2.96	5.22
37	43⅞	35½	43⅜	14	20⅞	9	50,900	452,900	Mathieson Alkali	No	650,426	1.50		1.88	2.96
63	73	62	74½	25	30⅜	13⅜	11,900	177,566	Monsanto Chem.	10	429,000	1.25		2.98	1.73
88¼	111¼	88⅛	124⅞	16⅞	27¼	13	577,300	3,977,000	National Dist. Prod. cts. (new)	No	252,000			—	1.23
120	130	120	130*	43¼	92	45	1,900	27,100	National Lead	100	310,000	5.00			7.58
125⅛	125⅛	125	126	101	125	87	300	5,355	7% cum. "A" pfd.	100	244,000	7.00			
105	105	105	109½	75	105	61	100	3,130	6% cum. "B" pfd.	100	103,000	6.00			
...	7	4⅜	7½	1⅜	4⅜	1	15,200	169,200	Tenn. Corporation	5	858,204	1.00			1.21
37	41	29	41	15½	26½	12	260,700	1,303,900	Texas Gulf Sulphur	No	2,540,000	2.00		3.52	5.50
42	50½	40⅝	51⅞	19¾	36⅜	15½	138,100	2,196,800	Union Carbide & Carb.	No	9,001,000	1.20		2.00	3.12
23	29⅜	23¾	30⅜	10½	18	6⅜	28,300	554,500	United Carbon Co.	No	398,000			—	1.43
66	80½	62½	94	13½	36½	13½	220,600	2,246,800	U. S. Ind. Alc. Co.	No	373,846			—	z2.96
20⅞	27⅝	20⅛	36½	7⅝	23¾	5½	54,700	1,152,100	Vanadium Corp. of Amer	No	378,367				2.95
3¼	4½	3⅛	7⅜	⅝	2⅜	⅜	11,800	344,700	Virginia Caro. Chem.	No	487,000		Yr. Je. '30		Nil
16	19½	15⅞	26½	3¾	11½	3½	4,500	79,300	6% cum. part. pfd.	100	213,000		Yr. Je. '30		2.63
...	60½	60	63½	35⅝	69⅝	20	200	11,320	7% cum. prior pfd.	100	145,000		Yr. Je. '30		11.96
...	18	15⅜	20½	5	12⅜	1	2,600	93,100	Westvaco Chlorine Prod.	No		1.00		1.79	2.51
NEW YORK CURB															
10¾	14½	11½	15¾	3½	8½	1⅜	56,200	966,200	Amer. Cyanamid "B'	No	2,404,000			.21	
3¾	3⅞	3⅜	4½	1	2⅜	⅜	13,300	158,000	Brit. Celanese Am. Rcts.	2.43	2,806,000				
104	107	99¼	110	27	55	8	104	25,994	Celanese 7% cum. part. 1st pfd.	100	148,000	7.00			
...	84½	75	86½	51	64½	17	500	9,445	" 7% cum. prior pfd.	100	115,000	7.00			
19⅜	23⅞	11½	23¾†	2	5⅜	1⅜	16,500	58,500	Celluloid Corp.	No	195,000				
...	9½	8⅜	10½	4½	6⅜	4¾	4,500	112,100	Courtaulds, Ltd.	1£					
66	72	65½	78	30	39	21⅜	3,000	46,000	Dow Chemical	No	630,000	2.00			3.44
5¾	6⅜	4	8	½	1½	¾	13,100	51,400	Duval Texas Sulphur	No	500,000				
...	...	...	19	8	...	...	.....	5,200	Heyden Chemical Corp.	10	150,000	1.00			
...	...	...	7	4⅛	2⅞	2⅛	.....	1,150	Imperial Chem. Ind.	1£				1.21	
16⅜	17⅞	16½	20⅜	8	20⅛	6¼	2,300	.....	Shawinigan W. & P.	No	2,178,000	1.00			
CLEVELAND STOCK EXCHANGE															
..	...	...	24	22	25	21¾	.....	811	Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00		—	11.42
...	70	66	78	30	40	21½	901	12,214	Dow Chemical Co.	No	630,000	2.00			3.44
104½	104¼	104¼	104½	96	...	...	29	503	Dow Chemical Co., pfd.	100	3,000,000	7.00			
132½	136	131	136†	110	...	...	75	1,927	National Carbon, pfd.	100	5,600,000	7.00			
PHILADELPHIA STOCK EXCHANGE															
47¼	48¼	46	48¼†	25¼	40	19⅞	125	3,835	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30		7.97

1933 September Last	1933 High	1933 Low	1932 High	1932 Low	Sales In September	Sales During 1933	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE											
91⅞	94½	91⅞	94½†	70½	80	62	22	721	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
84	87½	77⅛	89	64	80	54½	333	2,767	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
...	7½	4½	14½	2½	18	1	39	1,072	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
...	63	60	74½	37	60	34½	10	331	By-Products Coke Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
101½	103½	101⅜	104½	101	104⅞	100⅜	16	575	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
..	62	56	65	38½	54⅞	32	7	232	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
5½	8½	4⅞	14⅞	2½	15½	½	179	27,694	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
...	94½	91½	98½	87¼	97¼	67	42	691	Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
37⅞	41⅜	36½	62	33¾	59	17	30	346	Ruhr chemical s. f. 6s	1948	6	A. O.	3,578,000
...	98½	95½	99½	87	90	66	67	945	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
...	70	66	76	50	66	39	7	227	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
65	70½	60	81	34¼	75	30	71	1,503	Vanadium Corp. conv. 5s	1941	5	A. O.	5,000,000
NEW YORK CURB											
70	72½	63½	80½	49	76	55	70,000	2,817,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
70	71½	63	80½	50	76	55	96,000	1,455,000	4½s., series "B"	1968	4½	M. N.	16,108,000
103	103	103	103½	101	103½	99	3,000	8,100	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30 w 13 mos.; Before inventory adjustment; *New Low; †New High

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The Trend of Prices

Business Mixed

September business as a whole showed a slight recession in the last half. Retail buying, however, registered decided improvement as the month progressed, aided by better employment conditions and purchasing power of the masses. Seasonal trend, of course, is upward at this time of the year.

Activity in most of the heavy industrial lines was hampered by strikes, notably steel, textile, furniture and shoes. Automobile production held up well, although September total was under August. September truck and automobile production totaled 139,153 units compared with 173,172 units in August and 47,897 units in September, 1932. This was a decline of 20% in September from August. Figures are preliminary and issued by National Automobile Chamber of Commerce. Ford figures are not included. Although 1st week in October showed an upturn seasonal trend from now on is usually downward.

Steel Activity Declines

Steel activity continued to decline each week until at the close operations were about at a 40-41% level. With large rail orders hovering nearby (if steel companies will consent to less than $40 a ton price) and several large portions of the public works program about to materialize production outlook for balance of the year is fairly bright. At the moment the strike situation in several steel centers is serious. Pig iron production declined 14% in daily rate in September.*

Electrical output after declining steadily throughout the month showed a larger than seasonal increase in the 1st week of October. Increase over a year ago is estimated at 10.2%.† Carloadings in the week ending Sept. 23 were 9.6% higher than in 1932, but 11.6% below corresponding period 2 years ago. Carloadings compare:

	1933	*1932*	*1931*	*1930*
Sept. 23	652,669	595,604	733,036	950,663
Sept. 16	652,016	587,246	742,614	952,561
Sept. 9	571,387	501,537	667,750	965,813
Sept. 2	666,652	561,325	759,871	856,549
Aug. 26	631,998	537,767	763,551	984,510

*American Iron & Steel Institute reports September steel tonnage of 2,310,982 tons, as against 2,900,611 tons in August and 3,203,810 tons, which was largest output since August, 1930. In September, '32 total was 991,858 tons. September operations were at average rate of 40.89% against 49.42% in August and 58.95% in July. Total output for 9 months amounts to 17,404,595 tons compared with 10,342,520 tons in corresponding period in '32 and 13,322,833 tons for entire year. Steel backlog declined 114,704 tons in September to 1,775,740, record low to 1910.

†Edison Electric Institute reports power production of 7,074,103,000 kilowatt hours in August, compared with 6,237,229,000 hours in August a year ago, an increase of 13.4%. For 12 months ended Aug. 31 total reached 77,408,196,000 kilowatt hours against 79,567,890,000 in preceding 12 months, a decrease of 2.7%.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, Aug.	236,480	233,080	90,325
–†Brokers Loans, Sept. 27	$806	$825	$425
*Building Contracts, Aug.	$106,131	$82,693	$133,988
–*Car Loadings, Sept. 23	652	652	595
†Commercial Paper, Aug. 31	$107	$97	$108
–†Elec. output., kwh., Sept. 23	1,638	1,663	1,490
Payrolls, July	49.9	46.1	39.6
Failures, Dun, Aug.	1,472	1,421	2,796
*Merchandise Imports, Aug.	$155,000	$143,000	$91,102
*Merchandise Exports, Aug.	$131,000	$145,000	$108,599
Furnaces in Blast, % Sept. 1	34.4	37.2	14.7
*Steel Orders, Aug. 31	1,890	2,020	1,969

*000 omitted. †000,000. –Weeks, not months.

Textile industry was adversely affected by strikes. Finishers and dyers in the Paterson district, specially, were seriously hampered. Actual demand from retailing outlets, however, was better and cotton forwardings after receding steadily for weeks showed a slight seasonal improvement in the 1st week in October. Textile prices are now double those prevailing in April.

Building statistics are somewhat encouraging, although the public works program has not reached that stage as yet where it is being felt to any great degree. Glass and paper industries remain very active. Tanning and shoe industries after a slow period around Sept. 1 again moved forward. Paints were in better seasonal demand but total to date is somewhat disappointing. Petroleum field looked better than it has for months with the Government placing definite limits on crude production.

Exceedingly high rate of activity in the shoe industry prevailing for past 6 months indicates, according to authorities, strong possibilities of a poor 4th quarter. August reached an all-time record of 40,000,000 pairs against previous record made in October 1929 of 37,000,000 pairs. Last quarter production is expected to run around 22,000,000 pairs monthly. Despite expected reduction total for '33 will run close to record '29 year when 361,402,000 pairs were produced.

If so-called heavy industries did not seem to improve other fields did report encouragingly. For 1st time since 1930 American Telephone reported a net gain (approximately 29,000) in installations for September. Sales of electrical appliances continue to expand at a rather amazing rate. (August hit an all-time record for refrigerators). Employment and payroll statistics indicate over 2,500,000 back to work since the March low and an increase in total payroll figures of close to $12,000,000 for August alone.

N. Y. Times Index of Business Activity declined steadily in 1st 3 weeks in September. On Sept. 23 it stood at 77.7 against 78.4 in preceding week and compared with 67.9 for the week ended Sept. 24, 1932; High for '33 was close to 99.‡

	Weeks Ended Sept. 23 *1933*	Sept. 16 *1933*	Sep.t 24 *1932*
Combined Index	**77.7**	**78.4**	**67.9**
Without cotton fdgs.	78.2	79.1	....
Freight car loadings	61.0	60.8	55.7
Steel mill capacity	56.4	59.0	24.6
Electric power production	93.3	93.8	84.9
Automobile production.	54.8	59.8	26.0
Lumber production	58.6	60.9	35.5
Cotton forwardings	76.8	74.8	97.6

Commodity prices made net gains in September although in last week recessions were general. Fisher's Index closed at 71.4 (Sept. 29) as against 70.8 on Sept. 1. Week ending Sept. 29, however, saw a 0.2 decline, 1st in 6 weeks. *N. Y. Journal of Commerce* Sept. 2 stood at 68.5 and on Sept. 30 at 71.9 (year's low, Feb. 4, 52.3). It too lost ground in the last week, however.** *Annalist* Weekly Index declined from 71.4 on Aug. 29 to 69.3 on Sept. 26. Labor Dept.'s Index rose to 71.5 on Sept. 23 from 89.6 on Aug. 26. And last, National Fertilizer Association made a net gain of 2.6 between Aug. 26 and Sept. 23.

September chemical tonnages were slightly below August but showed up better as the month progressed. Prices remained steady. N. F. A. Indices compare as follows:

	Sept. 23 '33	*Sept. 16 '33*	*Month Ago*	*Year Ago*
Metals	78.8	78.4	78.5	70.1
Fats & Oils	48.8	48.7	48.7	43.3
Chem. & Drugs	87.0	87.0	87.0	87.4
Fertilizer Mat.	63.8	63.3	65.1	61.6
Mixed Fert.	70.2	70.2	66.7	69.0

Other indices also indicate but little change in prices in chemical and allied fields.

Index	*Sept. 25*	*Aug. 26*	*Sept. 27, 1932*
Annalist chemicals	97.0	97.2	95.2
Dept. of Labor (chem. & drugs)	72.1	72.5	...

Business faces strong immediate possibility of enjoying best quarter for many years. This may also be true of the chemical field with October likely to be a good month. In normal times it shares with March distinction of being best tonnage month. Outcome of strikes and the Administration's currency program loom up as the most important factors to consider.

‡After 10 weeks of decline Index ▲ advanced .7 Sept. 30.

**Fisher Index lost .03 Oct. 6; *Journal of Commerce* .05, Oct. 7.

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Prices Current

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Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1932 Average $1.64 - Jan. 1932 $1.54 - Sept. 1933 $1.40

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31
Acetamide.....lb.	.95	1.35	.95	.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	...	.26	.20	.26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks.....lb.	....	.09	.08	.10	...	.10
Acetone Oil, bbls NY.....gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).....						
Acids						
Acid Abietic.....	....	.06	.06	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks .....100 lb.	....	2.91	2.65	2.91	2.40	2.75
Glacial, bbl c-1 wk....100 lb.	....	10.02	9.14	10.02	8.35	9.14
Adipic.....	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85	.95
Technical, bbls.....lb.	.65	.70	.65	.70	.65	.70
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. .....lb.	.0425	.05	.0425	.05	.0425	.07
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric.....lb.	....	5.25	...	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99¾%, drs.....lb.	.12	.12¼	.11½	.12¼	.11½	.14½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....lb.	.29	.30	.29	.30	.29	.33½
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	.44	.45	.38	.45	.40	.47
97-99%, pale drs NY.....gal.	....	.47	.40	.47	.42	.50
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums.lb.	....	.35	...	.35	.....	.....
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60	.70
USP, bbls.....lb.	....	.74	...	.74	.....	.74
Gamma, 225 lb bbls wks.....lb	.77	.79	.75	.79	.75	.80
H, 225 lb bbls wks.....lb.	.65	.70	.60	.70	.60	.65
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.59	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic.....						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	....	.07	.06	.07	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.....lb.	.36	.37	.36	.37	.36	.42
Linoleic.....lb.	.16	.16	.16	.16	.16	.16
Maleic, cry. kegs.....lb.	...	.35	...	...	...	...
Malic, powd, kegs.....lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls.....lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric.....						
tanks wks.....N unit	.06½	.07½	.06½	.07½	.07	.07½
tanks wks.....S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.55	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	....	1.35	...	1.35	.....	1.35
tanks, wks.....100 lb.	....	1.00	...	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	...	1.45	.....	1.45
N & W.....250 lb bbls	.85	.95	.85	.95	.85	.95
Naphthenic, drums.....lb.	.10	.11½	.10	.11½	...	...
Naphthionic, tech.....250 lb.	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks. .....100 lb.	....	5.00	...	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	....	6.00	...	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11¼	.11	.11¼
Phosphoric 50%, U. S. P.....lb.	....	.14	...	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	...	.14	.....	.14
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.....lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals..... .....lb.	1.40	1.45	1.40	1.45	1.45	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.....	.....
Sulfanilic, 250 lb. bbls.....lb.	.15	.17	.15	.17	.14½	.16

†Anhydrous 5c higher. ‡From grain 5c higher. *Delivered metropolitan area, basic price 34c. §Higher price is refrigeration grade.

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	.....	15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	....	18.50	....	18.50	.....	18.50
40%, 1c-1 wks net.....ton	....	42.00	....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	....	.25	.20	.25	.20	.25½
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75	.85
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	.....	2.75
Kegs.....lb.	...	1.75	....	1.75	.....	2.00
Tungstic, bbls.....lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.35	.43	.35	.43	.35	.40
dark.....bbls., lb.	.10	.17	.10	.17	10	.20
Egg, edible .....lb.	.83	.84	.74	.84	.75	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible.....lb.	.65	.70	.60	.70	.60	.65
Technical.....lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks.....lb.	....	.10½	....	.10½	.123	.1595
Drums, 1-c-1 wks.....lb	....	.11	....	.11	.128	.1645
Tank cars wks.....lb.	....	.09½	....	.09½	.113	.143
Secondary tank .....lb.	....	.076	....	....	.....	....
drums carlots .....lb.	....	.086	....	....	.....	....
Amyl (from pentane) Tanks wks .....lb.	....	.143	.143	.176	.176	.203
Capryl, tech, drums.....lb.	....	.85	....	.85	.....	.85
Diacetone, tanks.....lb.	.15¾	.16¼	.15¾	.16¼	.....	.....
Ethyl, USP, 190 pf, 50 gal. bbls‡.....gal.	2.41½	2.58½	2.41½	2.65	2.55	2.65
No. 5. *188 pf, 50 gal. drs. drums extra†.....gal.	....	.351*	....	.385*	.27	.396
No. S. D. 1, tanks.....gal.	....	.304	....	.304	.....	.....
Furfuryl, tech., 500 lb. drs.lb	....	.40	.40	.45	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.....	.75
Isopropyl, ref, gal drs.....gal.	....	.50	.45	.50	.45	.65
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls.....lb.	.65	.70	.65	.70	.57	.65
Alpha-Naphthylamine, 350 lb. bbls.....lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks.....100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks .....100 lb.	....	6 50	4.50	6 50	4.50	5.25
Potash, lump, 400 lb casks wks.....100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks .....100 lb.	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.00	24.30	22.90	24.30
Chloride Anhydrous .....lb.	.04	.08	.04	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls.....lb.	.15	.16½	.15	.16½	.15	.17
Resinate, pp., bbls.....lb.	.12½	.14	...	...	...	...
Stearate, 100 lb bbls.....lb.	.16	.17	.12½	.17	.15	.21
Sulfate, Iron, free, bags c-1 wks.....100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	.04½	.05⅛	.04½	.05½	.05	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont.....	....	.05	.....	.05	.....	.....
Ammonium Acetate .....lb.	.26	.33	.26	.33	.26	.39
Bicarbonate, bbls., f.o.b. plant .....100 lb.	....	5.15	....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.15½	.17	.15½	.17	.14½	.22
Carbonate, tech, 500 lb cs .lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks .....100 lb.	5.00	5.25	4.45	5.25	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10	.11	.10	.11	.10½	.11½
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15	.16
Linoleate.....lb.	....	.11	....	.11	.11	.15
Nitrate, tech, casks.....lb.	.03½	.05	.03½	.10	.06	.10
Oleate, drs.....lb.	....	.10	....	.10	.....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.27½
Phosphate, tech, powd, 325 lb. bbls.....lb.	.08½	.11½	.08½	.11½	.08½	.12
Sulfate, bulk c-1.....100 lb.	....	1.20	1.00	1.20	.90	1.40
Sulfocyanide, kegs.....lb.	.36	.48	.36	.48	.36	.48
Amyl Acetate, (from pentane) Tanks del.....lb.	....	.13½	...	.13½	.157	.17½

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MURIATE OF POTASH

AMERICAN POTASH & CHEMICAL CORP.

Woolworth Building New York

Amyl Acetate
Calcium Chloride

Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Tech., drs del. ....lb.	.142	.149	.138	.149	.17½	.18
Amyl Alconol, see Fusel Oil....						
Aniline Oil, 960 lb drs & tks..lb.	.13½	.14½	.14½	.16	.14½	.16
Annatto, fine....lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80%....lb.	....	.75	....	....	.....	.....
40%....lb.	....	.18	....	....	.....	.....
Anthraquinone, sublimed, 125 lb. bbls....lb.	....	.45	...	.45	.45	.55
Antimony, metal slabs, ton lots ....lb.	....	.07¼	.05½	.07½	.05	.06½
Needle, powd, bbls....lb.	.08	.09	.07	.09	.08½	.09
Chloride, soln (butter of) cbys....lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls....lb.	.08½	.11	.07½	.11	.07½	.08½
Salt, 63% to 65%, tins....lb.	.22	.24	.20	.24	.20	.24
Sulfuret, golden, bbls ....lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls....lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls....lb.	.20	.21	.20	.21	.17	.21
Double, 600 lb bbls....lb.	.16	.17	.16	.17	.16	.17
Triple, 600 lb bbls.... ....lb.	.16	.17	.16	.17	.16	.17
Argols, 80%, casks....lb.	.14	.15	.12	.15	.12½	.13
Crude, 30%, casks....lb.	.07	.08	.06½	.09	.07	.07½
Aroclors, wks....lb.	.18	.30	.18	.30	.18	.40
Arrowroot, bbl....lb.	.08¼	.08½	....	....	....	....
Arsenic, Red. 224 lb kegs, cs..lb.	.13	.13¼	.09½	.13¾	.09½	.10
White, 112 lb kegs....lb.	.04	.05	.04	.05	.04	.05
Asbestine, c-1 wks....ton	13.00	15.00	13.00	15.00	.....	15.00
Barium						
Barium Carbonate, precip, 200 lb. bags wks....ton	56.50	61.00	56.50	61.00	47.00	57.00
Nat. (witherite) 90% gr. car-lots wks bags....ton	.....	40.00	....	....	....	....
Chlorate, 112 lb kegs NY..lb.	.15	.16	.13¾	.16	.13¾	.15
Chloride, 600 lb bbl wks...ton	61.50	65.00	61.50	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs...lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls....lb.	.04¾	.05	.04½	.05	.04½	.05½
Nitrate, 700 lb casks....lb.	.....	.07½	...	.07½	.07	.08
Barytes, Floated, 350 lb bbls wks....ton	22.50	30.50	22.20	30.50	22.00	24.00
Bauxite, bulk, mines....ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags....lb.	.15	.16	.14½	.17	.....	.....
Beeswax, Yellow, crude bags..lb.	.18	.19	.13	.20	.14½	.24
Refined, cases....lb.	.20	.24	.18	.26	.20	.28
White, cases....lb.	.32	.35	.30	.35	.30	.36
Benzaldehyde, technical, 945 lb. drums wks....lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks....gal.	.....	.22	.20	.22	.....	.20
Ind. Pure, tanks works....gal.	.....	.22	.20	.22	.....	.20
Benzidine Base, dry, 250 lb. bbls....lb.	.67	.69	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs.lb.	.40	.45	.40	.45	.40	.47
Benzyl Chloride, tech drs....lb.	.....	30	...	.30	.....	.30
Beta-Naphthol, 250 lb bbl wk.lb.	.....	.22	...	.22	.....	.22
Naphthylamine, sublimed, 200 lb bbls....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.53	.58	.53	.58	.53	.58
Bismuth, metal....	....	1.20	.85	1.20	.....	.....
Bismuth Subnitrate....	....	1.40	.95	1.40	.....	.....
Blackstrap, cane, (see Molasses, Blackstrap)						
Blanc Fixe, 400 lb bbls wks..ton	42.50‡	70.00	42.50	75.00	.....	.....
Bleaching Powder, 800 lb drs c-1 wks contract....100 lb.	1.75	2.00	1.75	2.00	1.75	2.00
Blood, Dried, fob, NY....Unit	2.65	2.70	1.55	2.70	1.20	1.90
Chicago, high grade....Unit	2.00	2.20	....	....	.....	.....
S. American shipt....Unit	2.60	2.65	1.90	3.00	2.00	2.25
Blues, Bronze Chinese Milori Prussian Soluble....lb.	.....	.35	...	.35	.....	.35
Bone, raw, Chicago....ton	26.00	28.00	19.00	28.00	20.00	22.00
Bone Ash, 100 lb kegs....lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls....lb.	.05½	.08½	.05½	.08½	.05½	.08½
Meal, 3% & 50%, Imp....ton	.....	26.00	18.00	26.00	20.00	23.00
Borax, bags....lb.	.018	.02	.018	.02	.018	.03¼
Bordeaux, Mixture, 16% pwd.lb.	.08½	.10½	.11½	.10½	.11½	.13
Paste, bbls....lb.	.08½	.13	.10½	.13	.11½	.13
Brazilwood, sticks, shpmt....lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases....lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk..lb.	.50	.75	.50	.75	.60	1.20
Gold bulk....lb.	.40	.55	.40	.55	.55	1.25
Butanes, com 16.32° group 3 tanks....lb.	.02½	.04	.02¾	.04	.....	.....
Butyl, Acetate, normal drs...lb.	.....	.11	.11	.139	.134	.166
Tank, wks.. ....lb.	.....	.10	.10	.124	.124	.143
Secondary tanks, wks....lb.	....	.08	....	....	....	....
Aldehyde, 50 gal drs wks...lb.	.35	.36	.31½	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)	.....	.....	....	....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether).....						
Furoate, tech.. 50 gal. dr...lb.	.....	.60	.50	.60	.....	.50
Lactate, drums ....lb.	....	.29	....	....	.....	.....
Propionate, drs....lb.	.20	.22	.20	.22	.20	.25
Stearate, 50 gal drs.. ....lb.	.25	.25½	.25	.25½	.25	.25½
Tartrate, drs....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes....lb.	.65	.75	.65	.75	.65	.90
Calcium, Acetate, 150 lb bags c-1....100 lb.	.....	3.00	2.50	3.00	2.00	2.50
Arsenate, 100 lb bbls c-1 wks....lb.	.....	.07	.05½	.07	.05½	.06
Carbide, drs....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks....ton	.....	19.50	19 50	21.00	.....	21.00
Solid, 650 lb drs c-1 fob wks ....ton	.....	17.50	17.50	18.00	.....	18.00

†F. O. B. destination, 1931 prices are works prices.
‡Lowest price is for pulp; highest for high-grade precipitate.

Current

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Calcium Furoate, tech, 100 lb. drums lb		.30	....	.30	.....	.30
Nitrate, 100 lb bags ton	24.50	26.00	24.00	26.00	34.00	35.00
Palmitate, bbls lb.	.18	.19	.16	.19	.....	.....
Peroxide, 100 lb drs lb		1.25	....	1.25	.....	1.25
Phosphate, tech, 450 lb bbls lb.	.07½	.08	.07½	.08	.07½	.08¼
Resinate, precip., bbls lb.	.13	.14	....	....	.....	.....
Stearate, 100 lb. bbls lb.	.16	.17	.12½	.17	.16	.18
Camphor, slabs lb		.49	.35½	.52	.....	.....
Powder lb		.49	.38	.52	.....	.....
Camwood, Bark, ground bbls lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags lb.	.09½	.10	.09	.11	.10	.14
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)		.....	....	...	.....	.....
Carbon, Decolorizing, drums c-1 lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY lb.	.06	.12	.06	.12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl lb	..	.06	....	.06	.....	.06
Tetrachloride, 1400 lb drs delivered lb.	.05¼	.06	.05¼	.07	.06¼	.07
Carnauba Wax, Flor, bags lb.	.31	.32	.23	.31	.23	.28
No. 1 Yellow, bags lb.	.28	.29	.20	.30	.21	.24
No. 2 N Country, bags lb.	.16	.16½	.14	.18	.13	.16
No. 2 Regular, bags lb.	.28	.29	.20	.29	.20	.24
No. 3 N. C lb.	.13	.13½	.11½	.16	.11	.13
No. 3 Chalky lb.	.13	.13½	.12	.14	.11	.13
Casein, Standard, Domestic ground lb	.14	.14½	.06½	.15	.04½	.07½
80-100 mesh carlots, bags lb.	.15	.15½	....	....	.....	.....
Cellosolve (see Ethylene glycol mono ethyl ether)						
Acetate (see Ethylene glycol mono ethyl ether acetate)						
Celluloid, Scraps, Ivory cs lb.	.13	.14	.13	.15	.13	.15
Shell, cases lb.	.18	.20	.18	.20	.18	.20
Transparent, cases lb		.16	....	.16	.....	.15
Cellulose, Acetate, 50 lb kegs lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls lb.	.03	.03½	.03	.03½	.03	.03½
Precip, heavy, 560 lb cks lb.	.02	.03½	.02	.03½	.02	.03½
Light, 250 lb casks lb.	.02½	.03½	.02½	.03½	.02½	.03½
Charcoal, Hardwood, lump, bulk wks bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks lb.	.06	.06½	.06	.06½	.06	.06¼
Wood, powd, 100 lb bbls lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks lb.	.01¼	.02	.01½	.02	.01½	.02
25% tks wks lb		.01½	.012	.01½	.07¼	.02½
Powd, 60%, 100 lb bgs wks lb		.04¾	....	.04¾	.....	.04¾
Powd, decolorized bgs wks lb.	.04¾	.05	.04¾	.05	.04¾	.06
China Clay, lump, blk mines ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract lb		.05½†	....	.05½	....	.05½
Liq tank or multi-car lot cyls wks contract 100 lb		1.75	....	1.75	1.55	1.75
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks lb.	.06	.07½	.06	.07½	.06	.10½
Chloroform, tech, 1000 lb drs lb		.20	.15	.20	.15	.16
USP, tins lb		.30	....	....	....	....
Chloropicrin, comml cyls lb.	.90	1.25	.90	1.35	1.00	1.35
Chrome, Green, CP lb.	.23	.29	.23	.29	.23	.29
Commercial lb.	.06½	.10	.06½	.10	.06½	.11
Yellow lb.	.14	.15	.14	.15	.14	.18
Chromium, Acetate, 8% Chrome bbls lb.	.05	.05¼	.04¾	.05¾	.04¾	.05¼
20° soln, 400 lb bbls lb		.05½	....	.05½	.....	.05½
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls lb.	.28	.33	.28	.33	.28	.35½
Coal tar, bbls bbl.	8.50	9.00	.50	9.00	10.00	10.50
Cobalt Acetate, bbls lb.	.75	.80	....	....	.....	.....
Carbonate tech., bbls lb.	1.34	1.40	....	....	.....	.....
Hydrate, bbls lb.	1.66	1.76	....	....	.....	.....
Linoleate, paste, bbls lb.	.39	.40	....	....	.....	.....
Resinate, fused, bbls lb		.12½	....	....	.....	.....
Precipitated, bbls lb.	.41	.42	.41	.42	.....	.....
Cobalt Oxide, black, bags lb.	1.15	1.25	1.15	1.25	1.15	1.45
Cochineal, gray or black bag lb.	.36	.42	.36	.42	.38	.57
Teneriffe silver, bags lb.	.37	.43	.37	.43	.39	.57
Copper, metal, electrol 100 lb		9.00	5.00	9.00	5.05	7.25
Carbonate, 400 lb bbls lb		.08	.07	.08	.07	.08
52-54% bbls lb.	.16¼	.17¼	.15¾	.17¼	.....	.....
Chloride, 250 lb bbls lb.	.17	.18	.17	.18	.17	.25
Cyanide, 100 lb drs lb.	.39	.40	.39	.40	.39	.40
Oleate, precip., bbls lb		.20	....	....	.....	.....
Oxide, red, 100 lb bbls lb.	.14¾	.15	.14¾	.15	.15	.16
Resinate, precip., bbls lb.	.18	.19	....	....	.....	.....
Stearate, precip., bbls lb.	.35	.40	....	....	.....	.....
Sub-acetate verdigris, 400 lb bbls lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-1 wks 100 lb		3.75	3.00	3.75	2.75	3.10
Copperas, crys and sugar bulk c-1 wks bags ton	14.00	14.50	14.00	14.50	14.00	14.50
Corn Syrup, 42 deg., bbls 100 lb		2.88	2.61	2.88	.....	.....
43 deg., bbls 100 lb		2.93	2.66	2.93	.....	.....
Cotton, Soluble, wet, 100 lb bbls lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1 ton		26.50	....	26.50	.....	26.50
Meal S. E. bulk ton		.....	....	....	.....	.....
7% Amm., bags mills ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls lb		.17¾	.14½	.17¾	.15½	.20½
Creosote, USP, 42 lb cbys lb.	.45	.47	.40	.47	.40	.42
Oil, Grade 1 tanks gal.	.11	.12	.11	.12	.11	.12½
Grade 2 gal.	.10	.12	.10	.12	.10	.11¼
Grade 3 gal.	.09	.12	.09	.12	.09	.11½
Cresol, USP, drums lb.	.10½	.11	.10½	.11	.10½	.11

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STAND BEHIND the PRESIDENT

SUSPENDING the rules of order that relegate the passing of resolutions to the closing days of convocation, the American Red Cross, at its annual convention last spring, took up at its first session the unanimous passage of the following resolutions:

"*Resolved*, that the first action of this Convention be to express to the President of the United States in behalf of its millions of members the most cordial greeting and good wishes of the American Red Cross, and be it further

"*Resolved*, that the American Red Cross and its thousands of Chapters and Branches covering the entire United States are at his service in any capacity which may best serve our people during the present emergency."

Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Crotonaldehyde, 50 gal dr....lb.	.32	.36	.32	.36	.32	.36
Cudbear, English.....lb.	.19	.25	.16	.25	.16	.17
Cutch, Rangoon, 100 lb bales..lb.....		.02¾	.02½	.03	.08½	.12
Borneo, Solid, 100 lb bale...lb.....		.04½	.02½	.04½	.03	.07
Cyanamide, bags c-l frt allowed Ammonia unit.....		1.07½	.97½	1.07½		.97½
Dextrin, corn, 140 lb bags.100 lb.	3.62	3.84	2.89	3.84	2.99	3.67
British Gum, bags .....100 lb.	3.87	....	3.89	....	....	....
White, 140 lb bags.....100 lb	3.57	3.79	2.94	3.79	2.94	3.37
Potato Yellow, 220 lb bgs..lb.	.07¾	.08¾	.07¾	.09	.08	.09
White, 220 lb bags lc-l...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags lc-l...lb.	.06¾	.07¾	.06¾	.08	.07	.08¾
Diamylether, wks., drums....lb.....		.60	....	....	....	....
Diamylphthalate, drs wks...gal.....		.20½	....	....	....	....
Dianisidine, barrels.....lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks.....lb.	.20½	.21	.20½	.22	.218	.23½
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.21	.29½	.31½
Dichlorethylene, drums.....gal.	.29	....	....	....	....	....
Dichloroethylether, 50 gal drs lb.....		.16	....	.16	....	.16
Dichloromethane, drs wks....lb.	....	.15	....	....	....	....
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, com. drs..gal.....		.31¾	....	....	....	....
Diethylaniline, 850 lb drs....lb.	.52	.55	.52	.55	.55	.60
Diethyleneglycol, drs.....lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.....		.26	....	.26	.24	.30
Diethylene oxide, 50 gal drs..lb.	.26	.27	.26	.27	....	....
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums.....lb.....		.20	.20	.26	.23	.26
Diethylsulfate, technical, 50 gal drums.....lb.	...	...	....	....	.30	.35
Digtycol Oleate, bbls.....lb.....		.16	....	....	....	....
Dimethylamine, 400 lb drs, pure 25 & 40% sol. 100% basis.lb.....		1.20	....	....	....	....
Dimethylaniline, 340 lb drs...lb.	.26	.28	.25	.28	.25	.27
Dimethyl phthalate drs.....lb.....		.24½	....	....	....	....
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.....		.18	....	.18	.15	.16
Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls....lb.	.15	.16	.15	.17	.16	.17
Dioxan (See Diethylene Oxide).....		....	....	....	....	....
Diphenyl.....lb.	.15	.25	.15	.40	.20	.40
Diphenylamine.....lb.	.31	.34	.31	.34	.34	.37
Diphenylguanidine, 100 lb bbl lb.	.33	.35	.30	.35	.30	.35
Dip Oil, 25%, drums.....lb.	.23	.25	.23	.25	.26	.30
Divi Divi pods, bgs shipmt..ton		28.00	26.00	32.00	26.00	30.00
Extract.....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases .....lb.	.42	.43	.40	.43	.40	.52
Epsom Salt, tech, 300 lb bbls c-l NY... .....100 lb.....		2.20	....	2.20	1.70	1.90
Ether, USP anaesthesia 55 lb. drs. .....lb.....		.24	.22	.24	.22	.23
(Conc) .....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums ...lb.	.07‡x	.08	.07	.08	.....	.....
Synthetic, wks, drums.....lb.	.08	.09	....	....	.....	.....
Ethyl Acetate, 85% Ester tanks.....lb.	.07½	.08	.07½	.09	.08½	.09
drums.....lb.	.08½	.09	.08½	.10	.09½	.10
Anhydrous, tanks.....lb.	.09	.10	.09	.10	.....	.10
drums.....lb.	.10	.10¼	.10	.10¼	.....	.10½
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums.....lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums.....lb.	.22	.24	.22	.24	.....	.22
Chlorocarbonate, cbys.....lb.....		.30	....	.30	.....	.30
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.....lb.....		1.00	1.00	5.00	.....	5.00
Lactate, drums works. ...lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.....		.12½	....	.12½	.....	.30
Oxalate, drums works.....lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks lb.	.30	.30½	.30	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont.....lb.	.75	.85	.75	.85	.7	.85
Dichloride, 50 gal drums....lb.	.05	.06	.05	.09	.0595	.07
Glycol, 50 gal drs wks.....lb.	.26	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks.....		.20	....	.20	.20	.24
Mono Ethyl Ether drs wks	.15	.17	.15	.17	.15	.20
Mono Ethyl Ether Acetate dr. wks.....	.16½	.18	.16½	.18	.16½	.23
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate.....	.18	.18	.18	.18	.18	.18
Oxide, cyl.....lb.....		.75	....	.75	.75	2.00
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery .....ton	15.50	16.50	14.00	16.50	15.00	20.00
Powdered, bulk works....ton	13.50	14.50	13.50	14.50	15.00	21.00
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.04½	.07½	.04½	.07½
Fish Scrap, dried, wks.....unit.....		2.60*	1.85	2.75*	1.60	3.00
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit.....		2.50†	1.85	2.50†	1.40	2.40
Fluorspar, 98%. bags.....28.00		35.50	28.00	35.50	28.00	46.00

*& 10; †& 50 xTanks 2c lower.

Formaldehyde

Formaldehyde, aniline, 100 lb..... drums.....lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks.....lb.	.06	.07	.06	.07	.06	.07½
Fossil Flour.....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-l bags.....ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,..lb.	.10§	.15	.10	.15	.....	.10
Furfuramide (tech) 100 lb dr..lb.....		.30	....	.30	.....	.30
Furfuryl Acetate, 1 lb tins....lb.....		5.00	....	5.00	.....	5.00
Fusel Oil, 10% impurities....lb.	.16	.18	.14½	.18	.....	.....

‡Higher price, refined. §Tanks, 1c lower

Current

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Fustic, chips	lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes	lb.	.20	.23	.18	.23	.18	.20
Liquid 50°, 600 lb bbls	lb.	.08	.10	.07	.10	.07	.08
Solid, 50 lb boxes	lb.	.16	.18	.14	.18	.14	.16
Sticks	ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls	lb.	.42	.43	.42	.43	.42	.50
Gall Extract	lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs.	lb.	.04½	.06¼	.03	.07	.06½	.07
Singapore cubes, 150 lb bg.	lb.	.05¾	.06¾	.05¼	.08	.07¾	.09
Gelatin, tech, 100 lb cases	lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l wks.	100 lb.	1.00	1.70	1.00	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY	100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags	100 lb.		2.33	....	2.33	2.36	2.75
Glue, medium white, bbls	lb.	.19	.23	.12	.23	.15½	.20
Pure white, bbls	lb.	.23	.28	.18	.28	.18	.27
Glycerin, CP, 550 lb drs	lb.		.10½	....	.10½	.09½	.11½
Dynamite, 100 lb drs	lb.		.09½	.07½	.09½	.07½	.09½
Saponification, tanks	lb.	.07½	.08	.05	.08	.04½	.06½
Soap Lye, tanks	lb.	.05¼	06	.04	.06	.03¾	.05
Glyceryl Stearate, bbls	lb.		.18	.17	.18	.....	.17
Graphite, Crystalline, 500 lb. bbls	lb.	.0	.0	.04	.05	.04	.05
Flake, 500 lb bbls	lb.	.08	.16	.08	.16	.08	.16
Amorphous bbls	lb.	.03	.0	.03	.04	.03	.04
Gums							
Gum Accroides, Red, coarse and fine 140-150 lb bags	lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags	lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags	lb.	.18	.20	.18	.20	.18	.20
Aloes, Barbadoes	lb.	.85	.90	.85	.90	.....	.....
Animi (Zanzibar) bean & pea 250 lb cases	lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases	lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts	lb.	.07½	.07¾	.05¼	.08	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags	lb.	.03	.06	.03	.05	.04	.06
Egyptian, 200 lb cases	lb.	.13	.15	.13	.15	.13	.15
Ester, light	lb.		.06	....	....	.....	.....
Dark	lb.		.05¾	....	....	.....	.....
Gamboge, pipe, cases	lb.		.55	.42	.55	.....	.....
Powdered, bbls	lb.	.60	.65	.50	.65	.....	.....
Gilsonite Selects, 200 lb bags	ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb cases	lb.	.13	.13½	.08½	.15½	.08½	.09
Batavia Dust, 160 lb bags	lb.	.07	.07½	.04	.07½	.04	.05½
E Seeds, 136 lb cases	lb.	.08	.09	.05½	.09½	.05½	.06½
F Splinters, 136 lb cases and bags	lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases	lb.	.15	.15½	.09½	.17½	.10½	11
No. 2, 224 lb cases	lb.	....	.09½	.07	.11½	.06	.07½
No. 3, 180 lb bags	lb.	.07	.07½	.04½	.07½	.04½	.05
Benzoin Sumatra, U. S. P. 120 lb. cases	lb.	.20	.20½	.17	.23	.18	.22
Copal Congo, 112 lb bags, clean opaque	lb.	.25	.25½	.16½	.25½	.16½	.17
Dark, amber	lb.	.09¼	.10	.06	.09¼	.06	.07
Light, amber	lb.	.12	.17	.08	.17	.08	.09
Water, white	lb.	.45	.48	.37	.48	.37	.45
Kino, tins	lb.	.75	.80	....	....	.....	.....
Mastic	lb.	.30	.34½	.26¾	.34½	.26¾	.40
Manila 180-190 lb baskets Loba A	lb.	.13	.13½	.09	.13½	.09	.11
Loba B	lb.	.12¼	.13	.08	.13	.08	.08½
Loba C	lb.	.11¼	.12	.07	.12	.07	.08
M A Sorts	lb.	.06½	.07	.05	.07	.04¾	.05
D B B Chips	lb.	.09	.09½	.05¾	.09½	.05	.06½
East Indies chips, 180 lb bags	lb.	.05½	.07	.04	.07	.04½	.05½
Pale bold, 224 lb cs.	lb.	.16	.17	.05½	.17	.06	.08
Pale nubs, 180 lb bags	lb.	.11	.13	.05	.13	.03½	.05
Pontianak, 224 lb cases							
Bold gen No. 1	lb.	.17	.18	.14	.18	.14	.16
Gen. chips spot	lb.	.06	.06½	.05	.07	.05	.08
Elemi, No. 1, 80-85 lb cs.	lb.	.11¾	.13½	.09	.12½	.09	.09½
No. 2, 80-85 lb cases	lb.	.11¼	.12	.08½	.12	.08½	.09
No. 3, 80-85 lb cases	lb.	.08	.08½	.08	.08½	.08	.08½
Ghatti, sol. bags	lb.	.08½	.09½	.06	.09½	.....	.....
Karaya, pow. bbls xxx	lb.	.23	.25	....	....	.....	.....
xx	lb.	.15	.16	....	....	.....	.....
No. 1	lb.	.10	.11	....	....	.....	.....
No. 2	lb.	.08	.09	....	....	.....	.....
Kauri, 224-226 lb cases No. 1	lb.	.20	.25	.20	.25	.20	.42
No. 2 fair pale	lb.	.12½	.16	.12½	.16	.12½	.30
Brown Chips, 224-226 lb. cases	lb.	.06½	.08½	.06½	.12	.10	.12
Bush Chips, 224-226 lb. cases	lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases	lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb. bags & 300 lb. casks	lb.		.40	.21	.40	.23	.25½
Senegal, picked bags	lb.	.15	.16	....	....	.....	.....
Sorts	lb.		.08	....	....	.....	.....
Thus, bbls	280 lbs.		8.25	....	....	.....	.....
Strained	280 lbs.		8.25	....	....	.....	.....
Tragacanth, No. 1 bags	lb.		1.00	.65	1.00	.....	.....
Yacca, bags	lb.		.04	....	....	.....	.....
Helium, 1 lit. bot.	lit.		25.00	....	25.00	.....	25.00
Hematine crystals, 400 lb bbls	lb.	.16	.18	.10	.18	.10	.18
Paste, 500 bbls	lb.		.11	....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks	lb.	.03½	.04½	.03½	.04½	.03	.04½
Bark	ton		16.00	....	16.00	.....	16.00
Hexalene, 50 gal drs wks	lb.		.30	....	.30	.30	.40
Hexane, normal 60-70° C. Group 3, tanks	gal.		.11	....	....	.....	.....
Hexamethylenetetramine, drs	lb.	.37	.39	....	....	.....	.....
Hoof Meal, f.o.b. Chicago	unit	1.40	1.60	.75	1.75	.75	1.35
South Amer. to arrive	unit	1.40	1.50	1.40	1.50	1.25	1.65

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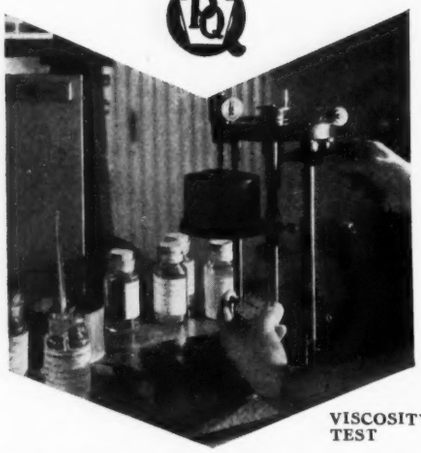

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574 FIFTH AVENUE · (at 47th Street) · NEW YORK CITY

Hydrogen Peroxide
Myrobalans

Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.....		3.15	....	3.15	.....	3.15
Hypernic, 51°, 600 lb bbls....lb.	.17	.20	.11	.20	.11	.12
Indigo Madras, bbls.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid.....lb.....		.12	....	.12	.....	.12
Iodine, crude.....per kilo.....		15s 6d	....	....	.....	.....
Resublimed, kegs.....lb.....		2.10	2.10	3.40	.....	.....
Irish Moss, ord. bales.....lb.	.06	.07	....	....	.....	.....
Bleached, prime, bales.....lb.	.08	.12	....	....	.....	.....
Iron Chloride see Ferric or Ferrous						
Nitrate, kegs.....lb.	.09	.10	.09	.10	.09	10
Coml, bbls.....100 lb.	2.75	3.25	2.50	3.25	2.50	3.25
Oxide, English.....lb.	.04½	.07	.04	.07	.04	.10
Japan Wax, 224 lb cases.....lb.	.06¾	.07	.05½	.08	.06	.09
Kieselguhr, 95 lb bgs NY.....						
Brown.....ton	60.00	70.00	60.00	70.00	60.00	70 00
Lead Acetate, bbls wks...100 lb.....		9.50	8.50	9.50	9.00	10.00
White crystals, 500 lb bbls wks.....100 lb.....		10.50	9.50	10.50	10.00	11.00
Arsenate, drs 1c-1 wks.....lb.	.10	.10½	.09	.10½	09½	.13
Dithiofuroate, 100 lb dr....lb.....		1.00	....	1.00	....	1.00
Linoleate, solid bbls.....lb.	.26	.26½	....	....	.....	.....
Metal, c-l NY.....100 lb.....		4.50	3.00	4.50	2.70	3.75
Nitrate, 500 lb bbls wks....lb.	.10	.14	.10	.14	.10½	.14
Oleate, bbls.....lb.	.15	.16	.15	.16	.15	.18
Lead Oxide Litharge, 500 lb. bbls..... lb.....		.06	.05½	.06	.05½	.07
Red, 500 lb bbls wks....lb.....		.08	.06½	.08	.06½	.07
Resinate, precip., bbls....lb.	.18	.18½	....	....	.....	.....
Stearate, bbls.....lb.	.22	.23	....	....	.....	.....
White, 500 lb bbls wks...lb.	.06½	.07	.06	.07	.06	.07
Sulfate, 500 lb bbls wk...lb.....		.06	.05½	.06	.05½	.06
Leuna saltpetre, bags c.i f.....ton.....		Nom.	....	Nom	.....	Nom.
S. points c.i.f.....ton.....		Nom.	....	Nom.	.....	Nom.
Lime, ground stone bags.....ton.....		4.50	....	4.50	.....	4.50
Live, 325 lb bbls wks....bbl.....		1.70	....	....	.....	.....
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.....gal.	.15	.17	.15	.17	.15	.17
Linseed cake, bulk.....ton.....		26.50	17.50	27.50	.....	.....
Linseed Meal.....ton.....		35.00	28.00	35.70	.....	.....
Lithopone, 400 lb bbls 1c-1 wks. .....lb.	.04½	.05	.04½	.05	.04½	.05
Logwood, 51°, 600 lb bbls....lb.	.08½	.12½	.05	.12½	.05	.08
Solid, 50 lb boxes.....lb	.13½	.17½	.08	.17½	.08	.12½
Sticks.....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch.....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	53.00	60.00	46.00	60.00	50.00	60.00
Magnesium Carb, tech, 70 lb. bags NY.....lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Chloride flake, 375 lb. drs c-l wks.....ton	34.00	36.00	34.00	36.00	35.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton.....		31.00	....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls .....lb.....		.42	....	.42	.....	.42
Heavy, 250 lb bbls.....lb.....		.50	....	.50	.....	.50
Palmitate, bbls.....lb.	.20	.21	....	....	.....	.....
Peroxide, 100 lb cs.....lb.	1.20	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls.....lb.	.10	.11	.08¾	.11	.09¾	.10½
Stearate, bbls.....lb.	.18	.19	.16½	.20	.16½	.26
Manganese Borate, 30%, 200 lb bbls.....lb.	.15	.16	.15	.16	.15	.19
Chloride, 600 lb casks.....lb.	.07	.08	.07	.08	.07	.08¾
Dioxide, tech (peroxide) drs lb.	.03¾	.06	.03½	.06	.03½	.06
Linoleate, lig. drums.....lb.	.18	.19	....	....	.....	.....
Resinate, fused, bbls.....lb.	.08½	.08½	....	....	.....	.....
precip., bbls.....lb.	.11½	.12½	....	....	.....	.....
Sulfate, 550 lb drs NY.....lb.....		.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.....		.04	....	.04	.....	.04
Bark, African.....ton	28.00	30.00	22.00	30.00	21.00	25.00
Marble Flour, bulk.....ton	12.00	13.00	12.00	13.00	12.00	15.00
Mereurous chloride.....lb.....		.77	.67	.77	.67	.93
Mercury metal.....76 lb flask.....		66.00	48.00	66.00	47.00	74.50
Meta-nitro-aniline.....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls.....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls.....lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol).....						
*Crude, tanks.....gal.....		.20	.20	.20	.....	.....
95% tanks.....gal.	.33	.35	.33	.35	.33	.35
97% tanks.....gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars gal.....		.39½	.37½	.39½	.37½	.41½
*Synthetic tanks.....gal.....		.35½	....	.35½	.....	.35½
*Denat. grade, tanks.....gal.....		.40	.35	.40	.....	.....
Methyl Acetate drums 82% gal.	.12	.13	.12	.13	.12	.17½
99%.....gal.....		.15	....	.15	.....	.15
Acetone, drums.....gal.	.54	.56	.42	.56	.47	.55
Hexyl Ketone, pure.....lb.....		1.20	....	1.20	.....	1.20
Anthraquinone.....lb.	.65	.67	.65	.67	.65	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether).....		.....	....	....	.....	.....
Chloride, 90 lb cyl.....lb.	.45	.45	.45	.45	45	.45
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs.....lb.....		2.50	2.50	3.00	.....	3 00
Molasses, blackstrap, tanks f.o.b. N. Y.....gal.	.06½	.07	.04½	.07	.....	.....
Monochlorobenzene, drums see, Chlorobenzene, mono.....lb.						
Monomethylparaminosulfate 100 lb drums.....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.....		.08¾	.03¾	.08¾	.03½	.07
Myrobalans 25%, liq bbls....lb.	.03½	.04½	.03½	.04½	.03½	.04½
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05	.05½

*delivered basis (east of Mics. River) †As of Sept. 1, $2.56

Current

Myrobalans
Phenyl-Alpha-Naphthylamine

	Current Market	1933 Low	1933 High	1932 Low	1932 High
J1 bags.....ton	32.00	27.00	35.00	34.00	35.00
J2 bags.....ton	21.50	22.75	15.50	22.75	15.25	18.50
R2 bags.....ton	17.50	18.00	15.00	22.00	14.75	17.50
Naphtha, v.m.& p. (deodorized)						
tanks, Group 3 tanks...gal.	.05¼	.05½	....	....	.....	.....
Bayonne, tanks.....lb.....		.09½	.08½	.09½	.08½	.10
Naphthalene balls, 250 lb bbls						
wks.....lb.	.05½	.06½	.05½	.06½	.03½	05½
Crude, imp.....100 lb.	1.81	1.85	1.75	1.85	.....	.....
Crushed, chipped bgs wks...lb.....		.04½	....	.04½	.....	.04½
Flakes, 175 lb bbls wks.....lb.....		.04¾	....	.04¾	.03¾	.04¾
Nickel Chloride, bbls.....lb.	.17	.18	.17	.18	.18	.20
Oxide, 100 lb kegs NY.....lb.	.35	.37	.35	.37	.35	.40
Salt bbl. 400 bbls lb NY...lb.	.12	.13	.11	.13	.10½	.13
Single, 400 lb bbls NY.....lb.	.12	.12	.11	.12	.10½	.12
Metal ingot.....lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases.....	8.25	10.15	....	....	.....	.....
Sulfate, 55 lb. drums.....lb.	.67	.75	.67	.75	.74½	.....
Nitre Cake, bulk.....ton	12.00	14.00	10.00	14.00	10.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.09*	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks....lb.	.27	.33	.27	.33	.25	.36
Nitrogenous Material, bulk.unit	2.75	3.00	1.50	3.50	1.35	1.55
Nitronaphthalene, 550 lb bbls.lb.	.24	.25	.24	.25	....	25
Nitrotoluene, 1000 lb drs wks.lb.	.17	.18	.14	.18	.14	.15
Nutgalls Aleppy, bags.....lb.....		.18	....	.18	.....	.18
Chinese, bags.....lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground.....ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole.....ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tannin, bbls..lb.	.03¾	.03½	....	....	.....	.....
Orange-Mineral, 1100 lb casks NY.....lb.....		.10½	.09½	.10½	.09½	.10½
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs....lb.	1.00	1.15	1.00	1.15	1.15	1.50
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums.....lb.	.13	.15	.13	.15	.13	.22
Orthodichlorobenzene, 1000 lb. drums.....lb.	.05½	.06	.05½	.06	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.28	.29	.28	.29	28	29
Orthonitrotoluene, 1000 lb drs wk.....lb.	.05½	.06	.05½	.06	.14	.18
Orthonitrophenol, 350 lb dr...lb.	.52	.80	.52	.90	.85	.90
Orthotoluidine, 350 lb bbl lc-l.lb.	.14½	.20	.14½	.22	.20	22
Orthonitroparachlorphenol, tins.....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals.....lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid.....lb.	.07	.07½	.06	.07¼	.06	.07½
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	14½	.15
Paraffin, refd, 200 lb cs slabs						
123-127 deg. M. P.....lb.	.041	.043	.02	.043	.02¾	.03
128-132 deg. M. P.....lb.	.045	.047	.03½	.047	.....	.03½
133-137 deg. M. P.....lb.	.05½	.05½	.043	.05½	.04	.04¾
Para Aldehyde, 110-55 gal drs.lb.	.20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs...lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums.....lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums..lb.....		....	....	....	.....	.....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks.....lb.	.16	.18	.15	.18	.15½	.16
Nitroacetanilid, 300 lb bbls.lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks.....lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23½	.24	.23½	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls.....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls....lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls...lb.	.29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls.....lb.	1.25	1.30	1.15	1.30	1.15	1.20
Toluenesulfonamide, 175 lb bbls.....lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk..lb.....		.58	....	.58	.42	.43
Paris Green, Arsenic Basis						
100 lb kegs.....lb.....		.24	....	.24	.24	.27
250 lb kegs.....lb.....		.23	....	.23	.23	.25
Persian Berry Ext., bbls.....lb.	.25	Nom	.25	Nom	.25	Nom.
Pentane, normal, 28-38° C, group 3, tanks.....gal.....		.07	....	.....	.....	.....
Pentasol (see Alcohol, Amyl)...						
Pentasol Acetate (see Amyl Acetate).....						
Petrolatum, Green, 300l b bbl. lb.	.01⅞	.02	.01⅞	.02	.02	.02½
Petroleum Ethers, tanks 30-60°, Group 3.....gal.....		.10	....	.10	.....	.....
Petroleum solvents and diluents						
Cleaners' naphtha, Group 3, tanks.....gal.	.06⅞	.07	.05	.07	.....	.....
Lacquer diluents, Bayonne tanks.....gal.	.12½	.12¾	.12	.12¾	.....	.....
Group 3, tanks.....gal.	.07⅞	.08	.06¼	.08	.....	.....
Petroleum thinner 47-49 deg. tanks, Group 3.....gal.	.04⅞	.05½	....	....	.....	.....
Rubber solvent, stand. grade tanks, Group 3.....gal.	.06½	.06½	.05	.06¼	.....	.....
East Coast tanks.....gal.....		.09½	.09	.09½	.....	.....
Stoddard solvents 48-50 deg. tanks, Group 3.....gal.	.05⅝	.06	.04½	.06	.....	.....
East Coast tanks.....gal.....		.09½	.09	.09½	.....	.....
Phenol, 250-100 lb drums....lb.	.14½	.15	.14½	.15	.14½	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs.....lb.....		1.35	....	1.35	.....	1.35

*tanks 1c less.

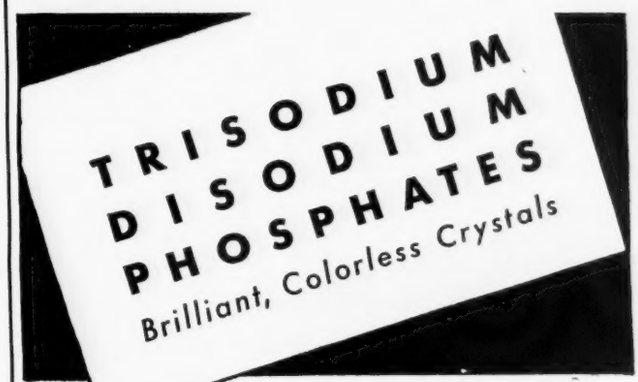
Amine Identification

As *3.5-Dinitrobenzoates*

IDENTIFICATION of amines as salts of 3.5-dinitrobenzoic acid possesses several important advantages over the use of sulphonic acids. The highly purified reagent is more readily available, it combines with a greater variety of aliphatic and aromatic amines, and the salts have low, sharp melting points. Buehler, Currier, and Lawrence in IND. AND ENG. CHEM. (ANAL. ED.) 5, 277-78 (1933) describe the use of this reagent and include a table giving the properties of 38 different amine salts of 3.5-dinitrobenzoic acid.

Eastman 3.5-Dinitrobenzoic Acid, chemical No. 635, melts sharply at 203-205° requiring no further purification for amine identification. Eastman Kodak Co., *Chemical Sales Division*, Rochester, N. Y.

EASTMAN ORGANIC CHEMICALS



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Secondary Amyl Acetate
Secondary Butyl Alcohol
Secondary Butyl Acetate

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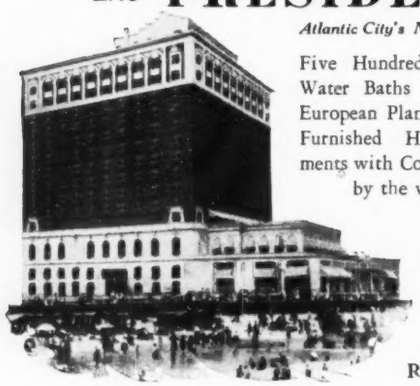

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Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Phenyl Chloride, drums.....lb.....	.16	....	....	.....	.....
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate Acid (see Superphosphate)					
Phosphate Rock, f.o.b. mines					
Florida Pebble, 68% basis..ton	2.80	3.20*	2.75	3.25	3.10	3.25
70% basis.....ton	3.30	3.70*	3.25	3.90	3.75	3.90
72% basis.....ton	3.80	4.20*	3.75	4.35	4.25	4.35
75-74% basis.....ton	4.85	5.30*	4.75	5.50	5.25	5.50
75% basis.....ton	4.95	5.40*	4.85	5.75	.....	5.75
77-80% basis.....ton	5.75	6.20*	5.75	6.30	.....	6.25
Tennessee, 72% basis.....ton.....		5.00*	....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.16	.20	.16	.23	.18	.20
Red, 110 lb cases.....lb.....		.45	.40	.45	.40	.46
Yellow, 110 lb cases wks.lb.	.28	.33	.27½	.33	.27½	.37½
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	38	.44
Trichloride, cylinders.....lb.	.16	.20	.16	.23	.18	.20
Phthalic Anhydride, 100 lb bbls wks.....lb.	.15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls					
Destructive dist.....lb.	.59	.62	.59	.62	.59	.63
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls.....gal.....		.59	.52	.59	.54	.61
Pitch Hardwood..... wks.....ton.....		20.00	20.00	25.00	20.00	35.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.40	3.50	3.30	3.50	3.30	3.50
Platinum, Refined.....oz.....		35.00	24.00	35.00	32.00	38.00
Pontol, tanks.....per gal.....		.54	....	.54	.54	.54
Potash, Caustic, wks, solid...lb.	.07½	07⅝	.06½	.07⅝	.06½	.06½
flake.....lb.	.0803	.08½	.0705	.08¼	.0705	.08
Liquid, tanks .....lb.....		.03⅝	....	....	.....	.....
Potash Salts, Rough Kainit 12.4% basis bulk.....ton.....		9.20	....	9.20	.....	9.20
14% basis.....ton.....		9.70	....	9.70	.....	9.70
Manure Salts..... 20% basis bulk.....ton.....		12.00	....	12.00	12.00	12.65
30% basis bulk.....ton.....		19.15	....	19.15	.....	19.15
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags.....ton.....		37.15	....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags.....ton.....		25.00	25.00	27.80	.....	27.80
Potassium Sulfate, 90% basis bags.....ton.	....	42.15	42.15	47.50	47.50	48.25
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks.....lb.	.07⅞	.08⅝	.07½	.08⅝	.07	.08½
Binoxalate, 300 lb bbls.....lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs.....lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.....		.06¾	.04½	.06¾	.0475	.05
Chlorate crystals, powder 112 lb keg wks.....lb.	.08½	.09	.08	.09	.08	.08½
Chloride, crys bbls.....lb.	.04	.04½	.04	.04½	.04	.04½
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.55	.60	.50	.60	.50	.57½
Iodide, 75 lb. bbls.....lb.....		2.70	2.35	2.70	.....	.....
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.13
Oxalate, bbls.....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.		.17½	.16	.17½	.16	.16½
Prussiate, red, 112 lb keg...lb.....		.35	.32½	.38½	.....	.38½
Yellow, 500 lb casks.....lb.	.16½	.17½	.16½	.17½	.16½	.21
Tartrate Neut, 100 lb keg...lb.....		.21	....	.21	.....	.21
Titanium Oxalate, 200 lb bbls .....lb.	.32	.35	....	....	.....	.....
Propane, group 3, tanks.....		.07	....	.07	.....	.....
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.04	.05
250 lb bbls.....lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	.....	2.25	2.00	2.25	2.00	2.45
Linseed Oil, kegs.....100 lb.	4.00	4.50	3.40	4.50	3.40	4.75
Pyridine, 50 gal drums ....gal.	.85	.95	.85	.95	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.....		.02⅞	.02	.02¾	.02	.03
450 lb bbls c-l .....lb.....		.02⅞	.02⅝	.02¾	.02½	.03¾
Solid, 63%, 100 lb bales cif..lb		.03⅜	.02⅝	.03⅜	.02	.02½
Clarified, 64%, bales... lb.....		.03½	.02⅝	.03½	.02½	.03½
Quercitron, 51 deg liquid 450 lb bbls .....lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes.....lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough.....ton.....		14.00	....	14.00	.....	14.00
Ground.....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	40	.44
Red Sanders Wood, grd bbls. lb.....		.18	....	.18	.....	.18
Resorcinol Tech, cans.....lb.	.65	.70	.65	.70	.65	.70
Rochelle Salt, cryst.....lb.		.12½	....	....	.....	.....
Rosin Oil, 50 gal bbls, first run .....gal.	.45	.46	.42	.46	.41	.45
Second run.....gal.	.50	.51	.46	.51	.45	.51
Rosin					
Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.					
B.....		4 92½	2.75	5 15	2.95	3.65
D.....		4 92½	2.95	5.15	3.15	3.75
E.....		4 95	3.55	5 15	3.37½	4.00
F.....		4 95	3.85	5 17½	3.40	4.15
G.....		4 97½	3.90	5 17½	3.45	4.15
H.....		4 97½	4.00	5 17½	3.45	4.20
I.....		5.00	4.05	5.20	3.47½	4.25
K.....		5 02½	4.60	5.20	3.60	4.65
M.....		5.05	4.35	5.20	4.20	5.25
N.....		5.10	4.75	5.30	4.65	6.05

*Higher prices run to Jan.-June 1935.

Current

Rosin
Starch, Potato

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Rosin, WG	5.30	4.80	5.60	5.25	6.45
WW	5.55	4.85	6.20	5.85	6.65
Rotten Stone, bags mines....ton	23.50	24.00	23.50	24.00	20.00	23.00
Lump, imported, bbls.....lb.	.05	.07	.05	.07	.05	.07
Selected bbls.....lb.	.09	.12	.09	.12	.09	.12
Powdered, bbls.....lb.	.02½	.05	.02	.05	.02	.05
Sago Flour, 150 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.04
Sal Soda, bbls wks.....100 lb.	.90	1.00	.90	1.00	.90	1.00
Salt Cake, 94-96% c-1 wks...ton	13.00	18.00	13.00	18.00	13.00	15.50
Chrome.....ton	12.00	13.00	12.00	13.00	12.00	14.50
Saltpetre, double refd granular 450-500 lb bbls.....lb.		.06	.05¾	.06¾	.06	.06¾
Satin, White, 500 lb bbls.....lb.		.01½	....	.01½	.....	.01½
Shellac Bone dry bbls.....lb.		.24	.18	.24	.16	.26
Garnet, bags.....lb.	.17	.18	.15	.20	.15	.20
Superfine, bags.....lb.	.16	.16¾	.09½	.18½	.10	.14
T. N. bags.....lb.	.15	.15½	.08½	.17½	.09	.13
Schaeffer's Salt kegs.....lb.	.48	.50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags.....ton	22.00	30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	.....	32.00	.....	32.00	.....	32.00
Extra floated bags.....ton	30.00	35.00	30.00	35.00	30.00	40.00
Silver Nitrate, vials.....oz.		.29⅜	....	....	.....	.....
Soapstone, Powdered, bags f.o.b. mines.....ton	15.00	22.00	15.00	22.00	15.00	22.00
Soda Ash, 58% dense, bags c-1 wks.....100 lb.		1.17½	....	1.17½	1.17½	.....
58% light, bags.....100 lb.	1.15	1.20	1.15	1.20	1.15	1.20
Soda Caustic, 76% grnd & flake drums.....100 lb.	2.90	3.00	2.90	3.00	2 90	3.00
76% solid drs.....100 lb.	2.50	2.55	2.50	2.55	2.50	2.55
Liquid sellers tanks, 100 bls.	2.15	2.20	2.15	2.20	.....	.....
Sodium Abietate, drs.....lb.		.03	....	.03	.....	.03
Acetate, tech 450 lb. bbls wks lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs.....lb.		.50	....	.50	.....	.50
Arsenate, drums.....lb.	.07¾	.08¾	.07¾	.08¾	.....	.....
Arsenite, drums.....gal.	.50	.75	.05	.75	.50	.75
Benzoate U.S.P., kegs.....lb.	.45	.47	....	....	.....	.....
Bicarb, 400 lb bbl.....100 lb.		2.25	....	2.25	.....	2.25
Bichromate, 500 lb cks wks lb.	.05	.05½	.044	.05½	.044	.05½
Bisulfite, 500 lb bbl wks....lb.	.03	.0335	.02½	.0335	.03	.04
Chlorate, wks.....lb.	.05½	.07½	.05½	.07½	.05½	.07½
Chloride, technical.....ton	11.40	14.00	11.40	14.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.15½	.16	.15½	.16	.15½	.17
Fluoride, 300 lb bbls wks....lb.		.07½	.07	.07½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.20	.21	.20	.21	.21	.24
Hypochloride solution, 100 lb. cbys.....lb.		.05	....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Iodide.....lb.		3.50	3.10	3.50	.....	.....
Metanilate, 150 lb bbls....lb.	.44	.45	.44	.45	.44	.45
Metasilicate, c-1, wks..100 lb.	2.65	3.05	2.65	3.25	2.85	4.00
Monohydrate, bbls.....lb.		.02½	....	.02½	.....	.02¼
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY .....100 lb.		1.26	1.26	1.31	1.185	1.73½
100 lb. bags lb.....ton		25.90	....	....	.....	.....
Bulk.....ton		23.90	....	....	.....	.....
Nitrite, 500 lb bbls spot....lb.	.07¾	.08	.07½	.08	.07½	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb	.17	.19	.17	.19	.17	.20
Peroxide, bbls. 400 lb.....lb.		.17	....	....	.....	.....
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.20	2.40	2.00	2.40	2.00	2.75
tri-sodium, tech, 325 lb bbls.....100 lb.		2.50	2.15	2.50	2.15	3.20
Picramate, 160 lb kegs ....lb.	.69	.72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks.....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks .....100 lb.		.75	....	.75	.....	.75
Silicofluoride, 450 lb bbls NY .....lb.	.05	.06	.04½	.06	.05½	.06¾
Stannate, 100 lb drums.....lb.	.32	.35	.18	.35	.17	.19
Stearate, bbls.....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02	.02¼	.02	.02¼	.02	.02¼
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
62% solid, 650 lb drums c-1 wks.....lb.	.03	.03½	.03	.03½	.03	.03½
Sulfite, crystals, 400 lb bbls wks.....lb.	.03	.03¼	.03	.03¼	.03	.03¼
Sulfocyanide, bbls .....lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.65	.67	.57	.67	.60	.88
Spermaceti, blocks, cases.....lb.	.18	.19	.17	.22	.....	.....
Cakes, cases.....lb.	.19	.20	.18	.23	.....	.....
Spruce Extract, ord., tanks..lb.		.01	.00⅞	.01	.00⅞	.01
Ordinary, bbls.....lb.		.01⅜	.01⅛	.01⅜	.01⅛	.01⅜
Super spruce ext., tanks...lb.		.01⅜	.01⅛	.01⅜	.01⅛	.01⅜
Super spruce ext., bbls....lb.		.01⅜	.01⅜	.01¼	.01⅜	.01¼
Super spruce ext. powd., bags .....lb.		.04	....	.04	.04	.04¼
Starch, powd, 140 lb bags .....100 lb.	2.84	2.95	2.29	2.95	2.29	2.67
Pearl, 140 lb bags.....100 lb.	2.74	2.85	2.19	2.85	2.19	2.84
Potato, 200 lb bags.....lb.	.05½	.06	.03¾	.06	.03¾	.06
Imported bags.....lb.	.06	.06½	.04¾	.06½	.04	.06½

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HORACE M. DOBBINS
General Manager

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Starch, Potato Soluble ....lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls....lb.	.07½	.08½	.07	.08½	.07½	.10
Wheat, thick bags....lb.	.06¼	.06¼	.05¾	.06¼	.06	.07
Thin bags....lb.	.10	.10¼	.09½	.10¼	.09½	.10
Strontium carbonate, 600 lb bbls wks....lb.	.07¼	.07¼	.07¼	.07½	.07¼	.07¼
Nitrate, 600 lb bbls NY....lb.	.07¼	.07¼	.07	.07½	.07	.07¼
Peroxide, 100 lb drs....lb.		1.25	....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-l....100 lb.		2.05	....	2.05	.....	2.05
Crude, f. o. b. mines....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-l NY....100 lb.		2.40	....	2.40	.....	2.40
Heavy bags c-l....100 lb.		2.50	....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-l NY....100 lb.		3.45	....	3.45	....	3.45
Roll, bbls lc-l NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks....lb.	.05	.05½	.05	.05½	05	.05½
Yellow, 700 lb drs wks....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl....lb.	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride....lb.	.15	.40	.15	.40	.1ɛ	.40
Sumac, ground....ton		67.00	50.00	67.00	....	.....
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY...ton	48.50	50.00	48.50	50.00	40.00	50.00
Refined, white bags....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks....ton		8.00	6.50	8.00	7.00	8.00
Run of pile....ton		7.50	6.00	7.50	.....	.....
Tankage Ground NY....unit		2.45*	1.70	2.75*	1.30	1.50
Unground....unit		2.35	2.35	2.60	.....	.....
High grade f.o.b. Chicago.unit		1.75*	1.40	3.00	1.00	1.80
South American cif....unit		3.00*	....	2.50	1.80	2.25
Tapioca Flour, high grade bgs.lb	.03	.05	.03	.05	.03½	.05
Medium grade, bags....lb.	.03	.04	.03	.04	.03	04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.22
25% drums....gal.	.23	.24	.23	.24	.23	.24
Tartar Emetic, Tech....gal.		.21½	....	....	....	.....
U. S. P....gal.		.27	....	....	....	.....
Terra Alba Amer. No. 1, bgs or bbls mills....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.50	2.00
Imported bags....lb.	.01½	.01½	.01½	.01½	.01½	.01½
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08	.09½
Tetralene, 50 gal drs wks....lb.	.12	.13	.12	.13	.12	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin....						
Crystals, 500 lb bbls wks...lb.		.36½	.24	.37	.22	.25
Metal Straits NY....lb.		.46	.23	.48	.211	.24½
Oxide, 300 lb bbls wks....lb.	.50	.52	.27½	.52	.23	.26½
Tetrachloride, 100 lb drs wks ....lb.		.24½	.126	.24½	.1420	.1457
Titanium Dioxide 300 lb bbl...lb.	.17½	.19½	.17½	.19½	.17½	.21
Calcium Pigment, bbls....lb.	.06½	.06½	.06½	.06½	.06¼	.07¾
Toluene, 110 gal drs....gal.		.35	....	.35	.....	.35
8000 gal tank cars wks....gal.		.30	....	.30	....	.30
Toluidine, 350 lb bbls....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks....lb.	.27	.28	.27	.28	.27	.32
Toner Lithol, red, bbls....lb.	.80	.85	.80	.95	.90	.95
Para, red, bbls....lb.		.80	....	.80	.....	.80
Toluidine....lb.		1.35	1.35	1.55	1.50	1.55
Triacetin, 50 gal drs wks....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.10	.10½
Triethanolamine, 50 gal drs..lb.	.35	.38	.35	.38	.35	.42
Tricresyl Phosphate, drs....lb.	.19	.26	.19	.26	.21	.26
Triphenyl guanidine....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums....lb.	.37	.39	.37	.39	.50	.65
Tripoli, 500 lb bbls....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten. Wolframite..per unit.	12.00	12.50	10.00	12.50	10.00	11.75
Turpentine carlots, N. Y. dock bbls....gal.		.46½	.46¼	.51½	.39	.47¾
Savannah, bbls....gal.		.41½	....	....	.....	.....
Jacksonville, bbls....gal.		.41½	....	....	.....	.....
Wood Steam dist, bbls....gal.		.43	.42	.48	.42	.46
Urea, pure, 112 lb cases....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f....ton		82.60	....	82.60	.....	82.60
c. i. f. S. points....ton		82.60	....	82.60	.....	82.60
Urea Ammonia liq. 55% NH_3, tanks,....unit		.96	....	....	.....	.....
Valonia Beard, 42%, tannin bags....ton		40.00	27.50	42.00	28.50	34.00
Cups, 30-31% tannin....ton		25.00	17.00	25.00	19.00	23.50
Mixture, bark, bags....ton		27.00	22.00	27.00	22.00	26.00
Vermillion, English, kegs....lb.		1.36	1.05	1.40	1.28	1.80
Vinyl Chloride, 16 lb cyl....lb.		1.00	....	1.00	.....	1.00
Wattle Bark, bags....ton		32.00	24.00	32.00	26.00	33.00
Extract 35%, tanks, bbls...lb.	.03¼	.03¾	.03	.03¼	.03	.06½
Whiting, 200 lb bags, c-l wks ....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-l NY....ton		15.00	13.00	15.00	.....	13.00
Gilders, bags c-l NY...100 lb.		1.35	....	1.35	.....	1.35
Wood Flour, c-l....bags	18.00†	30.00	18.00	36.00	.....	.....
Xylene, 10 deg tanks wks...gal.	.27	.29	.27	.29	.....	.29
Commercial, tanks wks...gal.		.26	....	.26	.....	.26
Xylidine, crude....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls....lb.	.04¾	.05	.04¾	.05	.....	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks....lb.	.05	.05¾	.05	.05¼	.05	.06
Gran, 500 lb bbls wks....lb.	.05¾	.06	.05¾	.06	.05¾	.06
Soln 50%, tanks wks...100 lb.		3.00	....	3.00	2.25	3.00
Cyanide, 100 lb drums....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb.		1.00	....	1.00	.....	1.00

*&10 †Depends upon grade

Current

Zinc Dust
Whale Oil

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Zinc Dust, 500 lb bbls c-l wks ..... lb.	.06¾	.04¾	.07½	.041	0525
Metal, high grade slabs c-l NY ..... 100 lb.	5.12	3.02	5.37	2.87	3.52
Oxide, American bags wk... lb.	.05	.06	.05	.06	.0485 .07
French, 300 lb bbls wks... lb.	.05¾	.11½	.05¾	.11½	.08¼ .11⅜
Palmitate, bbls..... lb.	.19	.20	.17½	.19	....
Perborate, 100 lb drs..... lb.	1.25	....	1.25	.....	1 25
Peroxide, 100 lb drs..... lb.	1.25	....	1.25	.....	1.25
Resinate, fused, dark, bbls. lb.	.05¾	.06½	.05¾	.06½	....
Stearate, 50 lb bbls..... lb.	.17	.18	.15	.18	.16 .22
Sulfate, 400 bbl wks..... lb.	.03½	.03½	.03	.03½	.03 .03½
Sulfide, 500 lb bbls..... lb.	.13	.13½	.12	.13½	.12 .13½
Sulfocarbolate, 100 lb keg.. lb.	.21	.22	.21	.22	.21 .24
Zirconium Oxide, Nat. kegs... lb.	.02½	.03	.02½	.03	.02½ .03
Pure kegs..... lb.	.45	.50	.45	.50	.45 .50
Semi-refined kegs..... lb.	.08	.10	.08	.10	.08 .10

Oils and Fats

Castor, No. 1, 400 lb bbls.... lb.	.09¾	.09¼	.10	.09½	.10½
No. 3, 400 lb bbls..... lb.	.09¾	.09	.08½	.09½	.08¾ .10½
Blown, 400 lb bbls..... lb.	.12¾	.12¾	.11½	.12¼	.11¼ .12½
China Wood, bbls spot NY... lb.	.07⅝	.08	.04¼	.09½	.05½ .07½
Tanks, spot NY..... lb.	.07½	.07⅝	.04¼	.08½	.04½ .06½
Coast, tanks..... lb.	.06½	.07	.04¼	.08½	.04½ .06½
Coconut, edible, bbls NY.... lb.		.10¾	....	.10½	..... .10¾
Ceylon, 375 lb bbls NY.... lb.	.04	.04½	.04	.04½	.04 .04¾
8000 gal tanks NY..... lb.		.03¼	.03	.03⅜	.02⅞ .03⅜
Cochin, 375 lb bbls NY.... lb.	.04¾	Nom.	.04½	.05¼	.04½ .06
TanksN Y..... lb.	.04½	Nom.	.04	.05	.03½ .05
Manila, bbls NY..... lb.	.04	.04½	.04	.04¾	.04 .05
Tanks NY..... lb.	.03¼	.03¼	.03⅛	.03¾	.03¼ .04
Tanks, Pacific Coast..... lb.	.02¼	.03⅛	.02¼	.03¼	.02¼ .03⅛
Cod, Newfoundland, 50 gal bbls ..... gal.		.31	.19	.31	.21 .30
Copra, bags, N. Y..... lb.		.0152½	.0152½	.019	.0175 .0235
Corn, crude, bbls NY..... lb.	.05¾	.06	.05¼	.07¾	.04½ .09
Tanks, mills..... lb.	.04¾	.04½	.02⅞	.06½	.02¾ .04½
Refined, 375 lb bbls NY... lb.	.06¼	.07	.06¼	.08¼	.05½ .07
Cottonseed, crude, mill Southeast & Valley..... lb.	.03½	.04	.02⅛	.05	.02⅛ .04¼
Texas..... lb.		.03½	....	....	....
Degras, American, 50 gal bbls NY..... lb.		.02¾	.02½	.03	.02½ .04
English, brown, bbls NY... lb.	.03¾	.04	.02⅛	.04	.02⅛ .04
Greases, Brown..... lb.	.02	.02⅛	.02	.02½	.01⅜ .02¾
Yellow..... lb.	.02⅝	.03	.01¾	.03⅜	.01⅜ .03
White, choice bbls NY..... lb.	.03	.03½	.02½	.04⅛	.02 .04¼
Herring, Coast, Tanks..... gal.		.22	.11	.23	....
Lard Oil, edible, prime..... lb.		.10½	.08½	.10½	.08½ .10
Extra, bbls..... lb.		.07¾	.07½	.08¼	.05¾ .07¾
Extra No. 1, bbls..... lb.	.07¼	.07½	.06	.08	.05½ .07
Linseed, Raw, five bbl lots... lb.		.111	.08	.12	.061 .078
Bbls c-l spot..... lb.		.107	.072	.11	.053 .07
Tanks..... lb.		.101	.066	.104	.047 .064
Menhaden Tanks, Baltimore.gal.	.17	Nom.	.09	.15	.09½ .20
Refined, alkali bbl..... lb.	.065	.071	....	....	....
Tanks..... lb.		.061	....	....	....
Light Pressed, bbls..... lb.	.053	....	....	....	....
Tanks..... lb.		.049	....	....	....
Neatsfoot, CT, 20° bbls NY... lb.		.16½	.11⅞	.16½	.11½ .13½
Extra, bbls NY..... lb.		.07¾	.06½	.08¼	.05¾ .07
Pure, bbls NY..... lb.		.13	.07¾	.14	.07¾ .09
Oleo, No. 1, bbls NY..... lb.		.06½	.05	.06¾	.05⅜ .07
No. 2, bbls NY..... lb.		.05⅜	.04¼	.06⅜	.04¾ .06
Olive, denatured, bbls NY... gal.	.74	.75	.47	.75	.51 65
Edible, bbls NY..... gal.	1.60	1.75	1.30	1.75	1.25 2.00
Foots, bbls NY..... lb.	.06½	.06¼	.04⅜	.06¾	.04¼ .05
Palm, Kernel Casks..... lb.	.03¾	Nom.	.04	.04¾	.035 .04⅜
Lagos, 1500 lb casks..... lb.	.04¼	.04¼	.02⅜	.04¾	.03 .05
Niger, Casks..... lb.	.03¾	.024	.04½	.04½	.03 .03½
Peanut, crude, bbls NY..... lb.	.07	Nom.	.03½	.07	.02¾ .04½
Refined, bbls NY..... lb.	.08	.11	.08½	.11	.08¼ .09
Perilla, bbls NY..... lb.	.09¾	.10	.05	.10¼	.03¾ .05¼
Tanks, Coast..... lb.	.09	Nom.	.03¾	.09½	.03½ .05
Poppyseed, bbls NY..... gal.	1.45	1.60	1.45	1.70	1.60 1.75
Rapeseed, in bond, bbls NY. gal.	.40	.43	.33	.43	....
denatured, drms, NY..... gal.	.50	.52	.34	.65	....
Red, Distilled, bbls..... lb.	.07	.07⅛	.05⅞	.07⅛	.06½ .07
Tanks..... lb.		.06	.05	.06	.05¼ .06
Salmon, Coast, 8000 gal tks. gal.	.19	Nom.	.11	.18	.11 .19
Sardine, Pacific Coast tks... gal.	.24	Nom.	.09½	.20	.09½ .17½
Sesame, edible, yellow, dos... lb.		.10	.09½	.10	.08½ .09½
White, dos..... lb.	.10	.11	.10	.11	.10 .11
Sod, bbls NY..... gal.		.40	....	.40	..... .40
Soy Bean, crude.....					
Pacific Coast..... lb.		Nom.	.032	.035	.02¾ .03½
Domestic tanks, f.o.b. mills, lb.		.07	.027	.085	.03 .032
Crude, bbls NY..... lb.	.076	.08	.04	.095	.03¾ .05
Refined, bbls NY..... lb.	.081	.093	.04½	.106	.04½ .06
Sperm, 38° CT, bleached, bbls NY..... lb.	.103	.105	....	....	....
45° CT, bleached, bbls NY.. lb.	.096	.098	....	....	....
Stearic Acid, double pressed dist bags..... lb.	.09½	.10	.07½	.10	.07½ .09
Double pressed saponified bags ..... lb.	.09½	.10	.08	.10	.07 .08½
Triple, pressed dist bags.. lb.	.12¼	.12¾	.10¼	.12¾	.10¼ .11
Stearine, Oleo, bbls..... lb.	.05¼	.05¼	.03½	.06¾	.03¾ .06
Tallow City, extra loose..... lb.	.03⅜	.03½	.02	.03⅞	.02½ .03⅜
Edible, tierces..... lb.	.04	.04⅜	.03½	.05½	.03⅜ .04½
Tallow Oil, Bbls, c-l NY... lb.	.05¾	.06	.05¾	.06	.05½ .07⅛
Acidless, tanks NY..... lb.		.06¾	.05	.07¼	.06 .09
Vegetable, Coast mats..... lb.	.06	Nom.	.04½	.06	.06 Nom.
Turkey Red, single, bbls ..... lb.	.07½	....	.06½	.07½	.06½ .09
Double, bbls..... lb.	.12½	.13	.08	.13	.08 .11
Whale,.....					
Winter bleached, bbls, NY.. lb.		.072	....	....	....
Refined natural, bbls, NY.. lb.	.068	.07	....	....	....

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